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FOREWORD

BY

THE HONOURABLE ALHAJI MOHAMMED MUSTAFA M.H.A., MINISTER OF AGRICULTURE, NORTHERN REGION OF NIGERIA

In general the 1958 rains were disappointing. They started late and there were droughts in parts of the Region, particularly in the Riverain Provinces.

Although the tonnages for the two major export crops of the Northern Region, groundnuts and cotton, fell below the 1957 record, they still approximated to the average figures for the last five years.

During the year, a Bird Control Unit was established to control the ravages of Quelea birds. At a recurrent cost of about £9,300 and a capital cost of £40,000, some 35,000,000 birds were destroyed in Bornu Province and hundreds of thousands of pounds worth of crops were thereby saved from their depredations. This was a notable achievement.

Tractor ploughing of fadamas continued and schemes were in operation in six different Provinces. The demand for mechanical assistance by rice farmers increased, but it was not matched by a willingness to pay the ploughing charge.

In the Irrigation Division plans were made to establish a Hydrological Section with the task of collecting and processing data to ensure that the best use will be made for agricultural purposes of the water resources of the Region. Although the primary object of the Niger dam scheme is the provision of hydro-electric power, it also holds out exciting prospects in the field of irrigation.

There was considerable progress in the building up of the research organisation and the lines of investigations followed have continued to produce good results. For example cotton experiments at Samaru have demonstrated th t a crop of over a ton per acre is obtainable; this is ten times the average yield in the Region.

One of the limiting factors in translating these results into the field has been the continued inadequacy in numbers of technical staff. I am grateful to the staff of my Ministry for their enthusiasm and hard work throughout the year.

Finally I wish to record that this publication will be the last annual report in its present form. In future the report will be published triennially.

Kaduna,
September, 1960.

CONTENTS

PART I—FIELD SERVICES DIVISION

	Page
Introduction	1
Staff	2
Buildings	3
Weather Conditions	3
Cereals	3
Maize Multiplication Scheme, Ilorin	3
Rice Seed Multiplication Scheme	4
Root Crops	4
Sugar	4
Tobacco	4
Groundnuts	5
Kano K50 Groundnut Multiplication Scheme	5
Cotton	6
Cotton Seed Multiplication	6
Benniseed	6
Soyabeans	7
Cowpeas	7
Tree Crops	7
Cocoa	8
Kola	8
Coffee	9
Oil Palm	9
Nurseries	10
Cattle	11
Farm Cattle	11
Sheep and Goats	12
Pigs	12
Cattle Multiplication Centres	12
Mixed Farming	13
Native Authority Demonstration Farms and Farm Centres	13
Unit Farms	14
Pasture Improvement	14
Government Poultry	15
Ducks	16
Turkeys	16
Native Authority Poultry Units	16
Fertilizer Campaign	16
Pests and Diseases	17
Quelea Campaign	17
Seed Dressing	18
Soil Conservation and Land-Use Areas	18
Mines Land Reclamation	19
Mechanisation	19
Experimental Tractor Farm—Mbatie	20
Mokwa Agricultural Project	21
Irrigation Schemes	21
Firki Bunding	22
Agricultural Shows	22
Legislation Affecting Agriculture	22
Summary	23
Glossary	23

PART II—PRODUCE INSPECTION DIVISION

	Page
Introduction	24
Festival of Kano	24
Staff	24
Administration	25
Gazetted Produce Inspection Stations and Markets	25
Groundnut Season	25
Special Grade	26
Purchases	26
Price	26
Quality	27
Standardisation and Packing	28
Storage	28
Railment	29
Deterioration	29
Pest Infestation	29
Groundnut for Local Oil Expressors	29
Groundnut Ex-subsidy Stations	30
Rivers Area Uninspected Groundnuts	30
French Groundnuts	30
Kano Laboratory	30
Cotton	30
Opening and Closing Dates of Seasons	30
Cotton Market Materials	31
Cotton Markets: Design and Construction	31
Cotton Classes	31
Buying Arrangements and Prices	31
Staffing of Cotton Markets	32
Supervision of Cotton Marketing	32
Standard of Work of Cotton Examiners	32
Purchases	33
Quality	33
Downgrading	33
Marketing	33
Evacuation	34
Ginneries	34
Benue Seed Cotton	34
Buying Arrangements and Prices	34
Markets and Marketing	34
Staff	35
Quality	35
Evacuation	35
Capsicums	35
Palm Kernels	35
Marketing and Quality	36
Evacuation	36
Palm Oil	36
Purchases and grading	36
Marketing and Quality	36
Cocoa	37
Purchases and grading	37
Marketing and Quality	37
Storage and Evacuation	37
Benniseed	37
Prosecutions	38

PRODUCE INSPECTION DIVISION—*continued* *Page*

Erection and Maintenance of Temporary Buildings ... 38
Erection ... 38
Maintenance ... 38
The Pest Control Unit ... 38
Spraying Machines ... 38
Motoblo Misblower ... 38
Swingfog ... 38
Prophylactic Measures ... 39
Groundnut Cake ... 39
Experiments ... 39
Rodent control ... 39
Grain (Guinea Corn) ... 39
Maintenance of Vehicles and Equipment ... 39
Festival of Kano ... 39

PART III—TRAINING AND EDUCATION DIVISION

School of Agriculture, Samaru ... 49
Examination Results ... 49
Speech Day and Prize Giving ... 50
Staff ... 50
Important Events During the Year ... 50
A.A.S. Class projects ... 51
Extra Curricular Activities ... 51
School Farms ... 51
Buildings ... 52
Academic Year, 1959 ... 52
Training and Education Division: Other Activities ... 53
Kabba School ... 53
Short Courses for Agricultural Instructors ... 54
Clerical Training ... 54
Other Activities ... 54

PART IV—IRRIGATION DIVISION

General ... 55
Office and Administration ... 57
Activities in the Provinces (Niger, Ilorin, Sokoto, Plateau, Kano and Bornu) ... 58

PART V—RESEARCH AND SPECIALIST SERVICES DIVISION

General Review of the Year ... 66
Buildings ... 66
Staff ... 66
Work of the Division ... 66
Botany Section ... 66
Sorghum ... 67
Groundnuts ... 67
Soya Beans ... 68
Sesame (Benniseed) ... 68
Cassava ... 68
Sugar Cane ... 68
Horticultural Crop ... 68

PART V—RESEARCH AND SPECIALIST SERVICES DIVISION—*continued* *Page*

Tree Crops, Kabba 69
Nursery Investigations 69
Plant Pathology 69
Cotton Breeding 70
Entomology Section 71
Colonial Termite Research 72
Soil Poisoning 72
Sensitivity of *Trinervitermes sp.* to Dieldrin 72
Agronomy Section 72
Long Term Fertility Experiments 72
Fertilizer Trials 73
Groundnuts 73
Sorghum 73
Yams 74
Swamp Rice 74
Chemistry Section 74
Soil Nitrate and Ammonia 74
Blind nuts in Groundnuts and Calcium Deficiency 75
Energy Requirements of Zebu Cows for Milk Production 75
Ensilage Experiments 75
Energy Cost of Grazing 75
Nutritive Value of Fodders 75
Animal and Grassland Section; Shika and Katsina 75
Soil Survey 77
Library 77

Part I—Field Services Division

INTRODUCTION

1. The Field Services Division continued to carry out experimental programmes on experimental farms and elsewhere, and to expand established extension services. In two further provinces, Kabba and Plateau, Provincial Agricultural Offices were moved into the provincial headquarters. More emphasis was given to tree crop surveys and extension in the Riverain provinces. An extended programme of rice investigations under uncontrolled water conditions was initiated in Birnin Kebbi, as were programmes of irrigation agronomy investigations in Ilorin and Bornu. A Bird Control Unit was set up in Bornu.

2. A large experimental programme was laid down. In Zuru a new area of 10 acres was selected for future experimental cropping and an experimental programme was approved for Mbatie tractor farm in Benue, thus increasing the experimental area.

3. Experimental crops included guineacorn, millet, groundnuts, cassava, cowpeas, benniseed, sugar cane, rice, soyabean, maize, sweet potato, pigeon pea, tobacco and yams. Experiments and trials were also carried out on seed dressing, fertilizers, range management, planting sequences, deficiencies and minor elements, ley farming, rotations, striga control, chemical control of spear grass and length of fallow.

4. The delayed rains meant that planting had to be concentrated into a shorter space of time. As the season progressed drought conditions adversely affected experiments and several were failures, particularly in the Riverain provinces.

5. Shortage of trained staff continued to set a limit to possible expansion as did the difficulties of being dependent on Native Authorities for extension workers.

6. In the northerly provinces the bulk of extension work was carried out by native authority staff with government officers acting in an advisory capacity.

7. In parts of the middle belt, such as Ilorin and Benue, increased availability of local staff made the fusing of government and native authority staff into an extension team a more practical proposition.

8. In the northerly provinces the emphasis of crop extension work continued to be on groundnuts and cotton. Propaganda was carried out on early planting, correct spacing and thinning, as applicable. The supervision of cotton seed distribution continued. The cotton close season also received attention particularly as the uprooting of cotton is often indifferently carried out.

9. Advice was given on the reduction of millet and guineacorn stemborers by crop sanitation methods.

10. In the areas where they are locally important cash crops, benniseed and soyabean extension work emphasised the improvement of quality.

11. In the riverain provinces, tree crop extension received most attention. This included advice on the planting and cultivation of cocoa, coffee and oil palm.

STAFF

1. Expanded extension and investigation programmes were made possible by the senior staff position which remained satisfactory, though it was not always possible to provide leave replacements for divisional officers. The trained junior staff position continued to be difficult and set a limit to the magnitude of extension work. The position was further aggravated by resignations and dismissals. The recruitment of Agricultural Instructors continued. Numbers of trained clerical staff remained low and in many cases the staffing of offices was barely adequate in consequence.

Post	*Establishment* 1958-59	*Strength*	*Vacancies*	*Joining*	*Leaving*
Field Services Division					
Secretary Field Services ...	1	1	—	—	
Deputy Secretary, Field Services	1	1	—	—	
Principal Agricultural Officers	15	10	5		1 Returned
Senior Agricultural Officers	10	9	1		1 On leave, due to retire 19-4-59.
Agricultural Officers	44	32	12		2 Retiring
Agricultural Superintendents	86	68	18	15	3 Promoted Agricultural Officers. 6 Contracts Expired.
Mechanic Demonstrators ...	12	10	2		
Assistant Agricultural Superintendents and Assistant Agricultural Superintendents (in-Training).	48	37	11		2 Resigned
Senior Agricultural Assistants.	11	2	9		4 promoted Assistant Agricultural Superintendents 1 promoted Senior Agricultural Assistant Grade I
Agricultural Assistants. Grade I	26	2	24		4 promoted Assistant Agricultural Superintendents
Agricultural Assistants. Grades II and III	145	72	73		9 promoted Assistant Agricultural Superintendents 4 Resigned
Senior Agricultural Instructors	12	12	—		
Agricultural Instructors. Grades I and II	172	102	70		2 Resigned 1 Invalided 1 Terminated 1 Dismissed

BUILDINGS

1. Routine maintenance was carried out at all centres. Water supplies were completed at Marguba C.M.C., and Bida farm. Buildings completed included stores, petrol stores, a cattle crush, a milking shed and cattle pens. At Wukari an Agricultural Assistant's house was converted into an Agricultural Superintendent's office.

2. A new house for a divisional officer was under construction by the Ministry of Works at Bama. A new house, office and store were built and occupied at Idah. In Ilorin an old cattle shed was converted in to a deep litter poultry house by the Ministry of Works.

WEATHER CONDITIONS

1. In the northerly provinces planting rains were late and planting was necessarily delayed. Subsequent rainfall was generally satisfactory but ceased by the end of September, making the season a particularly short one. This was reflected in the yields of food and export crops, particularly the latter. Intermittent Harmattan began to blow early after the end of the rains and continued until March when hot and humid weather was experienced.

2. In the riverain provinces an extended intermittent drought during the first part of the season gave rise to anxiety. Late rains did much to retrieve the position and the harvest was better than originally expected.

CEREALS

1. In the majority of provinces the guineacorn crop recovered sufficiently from the setbacks received in the early part of the season to produce average yields. Yields were below average in parts of Sokoto and Katsina and also in Benue, Kabba and Ilorin. In the last three provinces yields would have been even lower but for the good late rains.

2. In the Riverain provinces the early maize crop was average but the main crop was uniformly poor owing to erratic rainfall and late planting.

3. The season for swamp rice was not satisfactory except in certain provinces, such as Bornu, Katsina and Zaria. Elsewhere the absence of rain or the rapid rise of late high floods combined to reduce yields. The upland rice harvest was poor, the crop being adversely affected by the lack of rain.

Maize Multiplication Scheme, Ilorin

1. Groups of not less than 8 farmers are issued with pure maize seed dressed with Fernasan D, and with adequate fertilizer. This is grown as an early crop and the harvested seed is replanted in July or August of the same year. With the seed of this second crop each farmer expects to have enough seed to plant 3-4 acres in the following year.

2. Of the 2,468 farmers enrolled at the beginning of the year only some 50 per cent successfully obtained two crops. This was due to the

poor growing season and accepted as such by the farmers. The number of enrolled farmers had risen to 3,896 in March 1959.

Rice Seed Multiplication Scheme

1. A major part of the regional scheme was carried out in the Bida area. Fifteen and a half acres of 4 varieties yielded 26,318 lb. of Stage II seed at Badeggi. In other areas 31.8 acres yielded 49,523 lb. of Stage III seed.

2. Seed was issued to 10 farmers and the resulting crop bought back at market price. The purity of 97.75 per cent was fairly satisfactory.

3. Rogueing of Stage II was done by the staff of the Federal Rice Research Station. The costs worked out at £50 per acre or £60 per ton of paddy, which could be reduced by closer supervision, though the figures include expenditure of a non-recurrent nature in connection with new land at Edozhigi.

ROOT CROPS

1. An increased acreage of cassava was reported from almost all provinces, more particularly in the neighbourhood of towns. In areas such as those around Kano the planting of cassava is indicative of farmed-out land but it is also the normal reaction of farmers in a bad year when grain crops may fail and this was the main reason for the season's increased acreage. Yields were depressed in the drier areas.

2. In the provinces where the yam is an important food crop yields were generally average, apart from those in Ilorin. There were increased attacks by the yam beetle.

SUGAR

1. The tendency for brown sugar production to decrease continued, as an increasing proportion of the crop was sold as chewing cane.

2. The acreage increased in southern Katsina and the incidence of red rot was not severe. In Sokoto, the recent introductions of hard cane varieties gained in popularity because of their vigorous growth and tillering. Total brown sugar production in the province fell slightly from an estimated 2,621 tons last year to 2,500 tons.

3. The harvest was average in Plateau province but below standard in Zaria province. There was a small increase in acreage.

TOBACCO

1. Good crops were obtained in Zaria and Sokoto. In Bornu purchases were low, some cured leaf being rejected because of mouldiness. The quality of the harvest was also poor in Zaria.

2. Particulars of cured leaf purchased by the Nigerian Tobacco Company are as follows:—

Year	*Lbs*	*Year*	*Lbs.*
1946	171,040	1952	2,211,444
1947	82,272	1953	1,610,778
1948	217,120	1954	1,588,148
1949	300,715	1955	1,811,642
1950	735,865	1956	5,300,000
1951	1,315,316	1957	2,300,000
		1958	2,953,650

GROUNDNUTS

Owing to the late rains, the heavy weed growth during August, and the short season, tonnages purchased were some 20 per cent lower than those of the previous year. Increased acreages made up for reduced yields. A very high percentage of purchases were of Special Grade. The use of mechanical decorticators continued to increase.

Tons Purchased for Export

Year	*Tons*	*Year*	*Tons*
1946-47	322,699	1953-54	424,616
1947-48	329,581	1954-55	372,776
1948-49	328,072	1955-56	530,215
1949-50	188,118	1956-57	349,466
1950-51	142,526	1957-58	690,289
1951-52	418,255	1958-59	533,400
1952-53	430,926		

Kano K50 Groundnut Multiplication Scheme

1. The last phase of the four-year multiplication programme was reached with the purchase of 1,100 tons of seed from seed growers.

2. At the beginning of the planting season seed, superphosphate and Fernasan 75W, in standard £1 packs, were issued in the proportion of approximately 200 tons Stage III (multiplication) and 386 tons Stage IV (distribution). Full credit to farmers was given in old multiplication areas. Seed from this crop was bought back in November, Stage III, 139 tons (in shell) and Stage IV, 901 tons.

3. Owing to a number of factors, not least of which were the Festival of Kano and federal election duties, debt collection and advertising of seed issue terms in 1959 did not receive the amount of attention required.

4. The result was an outstanding debt to the scheme of some £4,000 and a remarkable resistance to the policy of issuing on 75 per cent credit terms (5*s* deposit) in all areas. As a result there was a last minute change, of plan and all seed was eventually disposed of on full credit.

5. Net loss, including depreciation on stores, vehicles and equipment for the year 1958-59 was £3,759-9*s*-10½*d*.

6. There can, however, be no doubt of the scheme's continued success and popularity.

COTTON

1. The late rains caused planting to be carried out even later than usual and this, coupled with the early cessation of the rains, combined to reduce yields. In some cases, however, the yields obtained were nevertheless better than had been expected. The total tonnage purchased for export was about 30 per cent lower than the previous season's record. The enforcement of the cotton close season continued to be difficult, particularly in those areas where the crop is expanding.

Tons of Seed Cotton purchased for Export

Year	*Tons*	*Year*	*Tons*
1946-47	18,300	1953-54	73,191
1947-48	9,862	1954-55	94,745
1948-49	25,316	1955-56	77,335
1949-50	31,417	1956-57	69,423
1950-51	40,862	1957-58	119,813
1951-52	60,748	1958-59	86,584
1952-53	47,041		

Cotton Seed Multiplication

1. At Daudawa Government Farm 34 acres of Stage B and 391.8 acres of Stage C cotton were grown. The average yield of seed cotton from Stage B was 607 lb. per acre, and from Stage C, 450 lb. per acre. One field on the main farm gave the record average of 1,007 lb. seed cotton per acre.

2. Sowing began on June 18th and was completed by July 3rd. A standard manurial dressing of 56 lb. superphosphate and 56 lb. sulphate of ammonia was applied at sowing time. Spraying of 138 acres on the main farm and 49 acres at Shemi cotton multiplication farm, was carried out. Sprayed fields averaged 636 lb. seed cotton per acre and unsprayed fields 361 lb. per acre. Spraying had little effect on boll worm infestation and damage was severe.

3. At Gombe, in Bauchi province, the cotton multiplication scheme remained unchanged except that due to the very heavy crop in Stage K. of 1957 extra seed was available for other markets outside the normal multiplication area, which effectively increased the Stage L of 1958. As a result Samaru 26J was more rapidly multiplied than originally expected.

BENNISEED

Despite late planting and setbacks during the growing season 14,744 tons were purchased for export in the main growing areas of Benue. An increased tonnage was also purchased in Kabba but the season was a poor one in Adamawa.

Purchases for Export

Year	*Tons*	*Year*	*Tons*
1946-47	4,085	1953-54	13,775
1947-48	8,605	1954-55	15,809
1948-49	15,642	1955-56	18,376
1949-50	13,385	1956-57	15,759
1950-51	9,188	1957-58	12,200
1951-52	10,387	1958-59	16,232
1952-53	13,387		

SOYABEANS

The crop was late planted and suffered from drought. There was also a considerable reduction in acreage, partly because of difficulties caused by poor seed and also because farmers do not consider the crop to be sufficiently remunerative. Tonnages purchased for export were low, particularly in Benue where they were the lowest since 1949.

Purchases for Export

Year	*Tons*	*Year*	*Tons*
1947-48	10	1953-54	8,731
1948-49	738	1954-55	9,109
1949-50	956	1955-56	9,598
1950-51	3,520	1956-57	15,758
1951-52	8,038	1957-58	15,036
1952-53	3,888	1958-59	3,056

COWPEAS

Zaria province reported above average yields but elsewhere yields were poor.

TREE CROPS

1. In January and February, 1959, Mr A. V. Gibberd, M.B.E., made a further tour of the tree crop areas of the Riverain provinces accompanied by Mr P. B. Harris, Agricultural Officer. On completion of their tour they submitted a report entitled "An Assessment of Tree Crop Development in the Riverain Provinces of the Northern Region of Nigeria with Recommendations regarding Future Policy and Administration." This report recommended expansion of the considerable programme of investigational and development work already in progress largely as a result of the recommendations in their 1957 report. Their main recommendations included a considerable programme of nursery experimental work to be carried out by the horticulturist at Kabba and measures to improve the standards and marketing arrangements of exported robusta coffee.

2. A full programme of observational trials was carried out in all the important tree crop areas in the 5 provinces mainly concerned viz, Kabba,

Ilorin, Benue, Niger and Zaria. Since practically none of these trials has been in progress for more than two years it was too early to expect results. In most cases establishment and subsequent growth of the various crops, usually oil palm, cocoa, coffee or kola, were satisfactory, but the long spell of drought in July caused heavy losses in some experiments which were being planted up at that time.

3. Although no spectacular development schemes were begun during the year, steady development of the main tree crops was carried on by the peasant farmers with the assistance of the Ministry.

4. The cocoa crop continued to expand in the Kabba area, but not so fast as robusta coffee which is proving very popular. Numerous small oil palm plantations were started throughout the area using seedlings grown from improved West African Institute for Oil Palm Research seed. Kola seedlings, grown from selected Labozhi seed were issued to farmers in all suitable areas.

Cocoa

1. Purchases exceeded 520 tons in Kabba where the crop is concentrated. This does not represent the total production as an unknown quantity was sold in the Western Region. The acreage is believed to have increased, and also the production, as a result of spraying against capsids.

2. In Ilorin 43 tons were purchased at Erinle, one of the two Ilorin Division markets, but only two cwt were bought at Omu Aran. This represents only 30-40 per cent of the total tonnage believed to have been harvested, the balance finding its way to the Western Region markets via middlemen.

3. The capsid spraying in Kabba province gave spectacular results. A total of 1,425 acres of farmers' cocoa was sprayed with Gamalin 20. About 46 per cent of the area was treated twice and the remainder once. The cost to the farmer was 22*s*-6*d* a quart for the insecticide. A quart is sufficient to treat one acre twice.

4. In Ilorin province farmers willingly paid a nominal charge of 10*s* per acre for two sprayings. Some 336 acres were treated.

5. Cocoa surveys were undertaken in Kabba and Ilorin provinces for the planning of future extension work which will include an overall capsid spraying campaign in both provinces.

Kola

1. The yield recording of selected trees was continued at Labozhi in Niger province.

The number of selected trees was increased from 96 to 140 and the number of seed from these trees issued to the kola growing areas of the region was increased from 17,900 in 1957-58 to 21,400.

2. In Zaria province some 1,500 kolanuts from Labozhi were planted but germination was slow. A total of 77 germinated kolanuts was sent to

Kagarko Native Authority for distribution. Some 1,700 kolas were planted in the Upper Dan Kurmi, as part of the Jema'a Settlement Scheme. The plantation extends over 36 acres.

3. In Niger province at Kandi (Lapai Emirate) regeneration treatments were begun in a too thickly planted plantation.

4. In Benue province, kola germination was very satisfactory and available seedlings exceed demand. Extension work in connection with the establishment of kola plantations continued, seedlings being issued to farmers in addition to being planted in government and Native Authority plantations. The establishment of shade and windbreaks continued to be a problem.

5. In Kabba province, trials on kola germination and establishment continued in the government nursery. Seedlings were issued to farmers from Native Authority nurseries.

6. Kola planted in Ilorin as part of an establishment-under-irrigation trial did not show very encouraging growth. Planting of seed for the issue of seedlings continued and some 612 were issued from Native Authority nurseries.

Coffee

1. In Kabba province production was estimated at 300 tons and this was sold through middlemen to the commercial firms for export. Production was increasing rapidly but the quality remained poor due to berry borer, bad harvesting techniques and intermixing of the main robusta crop with inferior liberica. A drive for the improvement of quality was undertaken by the extension staff. The scheme by which two robusta seedlings were offered for each liberica cut out was proving popular. Seedlings grown from selected robusta trees were raised in and issued from Native Authority nurseries.

2. On the Mambilla Plateau (Adamawa) 4,223 lbs. of arabica coffee were purchased for export by Adamawa Native Authority in Gembu. Extensive surveys were carried out by officers of the Ministry in this area and the conclusion was reached that the growing of arabica coffee could be increased to form a major cash crop on the plateau.

Oil Palm

1. A total of 163,158 E.W.S., seeds were received from the West African Institute for Oil Palm Research and these were germinated in wood-fired germinators at Yandev, Kabba and Ilorin. Germination was variable at 40-50 per cent depending on the age of the seed when put into the germinators and the efficiency of temperature control within the germinators. Germinated seeds were issued to government and Native Authority nurseries in all the tree crop areas.

2. There was quite a substantial demand for nursery seedlings from farmers. Many of the seedlings were used to plant up numerous small plantations, some experimental, some demonstration and others straightforward development.

3. In the Igala division of Kabba province the communal plantations tended to suffer from lack of maintenance. In Benue 5 acre village plantations, in which rows of palms were owned by individuals, were showing signs of success.

Nurseries

1. Distribution of budded and unbudded fruit trees mainly citrus, mangoes and guavas from government and Native Authority nurseries continued together with some expansion.

Many Native Authority nurseries received insufficient attention or suffered from inadequate management. Reliable figures from these are not available. Known issues included 15,781 budded citrus, 5,510 budded mangoes and 193,101 guavas.

2. In Bornu provinces all Native Authority nurseries had a satisfactory season. Nearly 270,000 trees were issued of which some 5,000 were budded mango and 2,000 budded citrus, the remainder being guava and lime. Private supplies of budded mangoes exceeded those of Native Authority nurseries. A vine nursery was established by Biu Native Authority to grow cuttings for issue to farmers.

3. Progress continued steadily in Kano province though there was a lack of water at Hadejia and a surplus of unsold trees at Jakana.

4. In Katsina province, the government nursery at Daudawa issued 106 budded mangoes in five land-use areas. No issues were made from the government nursery at Daura but 30 cirtus were budded. Four Native Authority nurseries sold some 1,300 trees of which 370 were budded.

5. In Sokoto province two concrete water storage tanks were erected in the Gusau orchard and nursery and this, coupled to the water supply, assured regular irrigation. A well was sunk in Maru nursery and a semi-rotary pump was supplied. Budding of citrus and mangoes continued on a limited scale at Bado and Kware, a total of 397 budded citrus and 24 budded mangoes being issued. Some 129 budded citrus and 31 budded mangoes were issued from the Birnin Kebbi nursery.

6. The seven Native Authority nurseries in Plateau province were run by untrained nursery boys supervised by untrained Native Authority staff and none of them were very efficient in consequence. Nevertheless more than 1,793 budded and unbudded trees were issued and nearly double the number were planted or set aside for future issue.

7. In Bauchi province, citrus, mango and guavas were distributed from established nurseries and in other orchards nursery work was initiated.

8. In Zaria Province budding of citrus was carried out at the Native Authority nursery at Zaria Water Works, from which budded citrus and mango were sold. Cashew and guava seed were issued from the Tudun Wada nursery. Divisional nurseries for the issue of fruit trees were maintained at Bida and Kontagora Farm centres and a provisional site was selected at

Minna. Issues from Kontagora included guava and pawpaw as well as kola and coffee.

9. Kofare nursery in Adamawa province is to be closed as the site is unsatisfactory. The smaller Native Authority nurseries received little attention as efforts were concentrated on the bigger nurseries in Jalingo, Mubi and Hong. Shortage of seed held up expansion, but issues included nearly 3,000 budded citrus, 418 mangoes and more than 7,000 guava.

10. The fruit tree nursery at Yandev, in Benue province, still suffered from the two previous poor budding seasons and only 2,871 budded citrus and 273 budded mangoes were available for sale, in addition to smaller quantities of lime and Pitanga cherry. Orders reached 20,000 in the case of budded citrus.

11. In Ilorin province some 2,700 citrus were budded in the Farm Centre nursery, a disappointing result attributed to the poor rains. More than 5,000 budded citrus were distributed. The two Native Authority nurseries at Pategi and Lafiagi suffered from inadequate supervision and little progress was made.

CATTLE

1. Despite shortages of grazing and water in various areas, numbers of cattle were maintained and losses from starvation appear to have been comparatively few. An increase of nomadic cattle was reported in Benue, owing to the reduction of tsetse brought about by increased clearing and cultivation, but a decrease was reported in southern Katsina and parts of Zaria where there was an increase of trypanosomiasis. A decrease in numbers in Kano was due to the continued, and increasing, shortage of grazing. There were several rinderpest outbreaks particularly in southern Katsina where a mortality of 12 per cent from this disease was estimated. Sporadic outbreaks of pleuropneumonia continued.

Farm Cattle

1. The health of cattle was generally satisfactory despite trypanosomiasis at Maigana and Daudawa and deaths from various causes, including D.G.V. inoculation.

2. As a result of policy changes, and in order to keep herds down to size, extensive culling was carried out in the majority of herds, a total of 259 animals being disposed of. The Ndama herds at Ilorin, and Lowland (Plateau) maintained satisfactory condition, the first named herd in spite of the poor natural grazing during the rains. In Benue and Niger the policy of grading up to Ndamas continued. In Kano the policy of grading up to Shuwas was discontinued and a start was made with a nucleus of white Fulani heifers to build up a pure herd of white Fulani. Two white Fulani bulls were transferred from Shika and when one of them died a replacement was brought in from Gaya Cattle Multiplication Centre. In Daura, six of the eight Azouak heifers purchased in Niger have now calved.

3. In the Shuwa milking herd in Maiduguri comparisons of dam and daughter yields indicated that inbreeding was having a detrimental effect on yields. The policy was therefore altered to introduce new stock bulls of known quality. The best milk yield was 6,119.5 lbs. in 305 days.

SHEEP AND GOATS

At Yandev, the comparison of three strains of dwarf sheep continued. These are "Yandev Black", "Tiv Brown" and "White and Black". No conclusive results could be drawn owing to heavy losses in the past two years. Deaths from "catarrhal fever" were high despite the year's low rainfall and dry weather.

The health of goats improved and selective breeding continued accompanied by the culling of animals with unsuitable characteristics.

At Kofare, in Adamawa, the sheep flock remained healthy and losses amounted to 10. Severe culling was carried out, leaving a herd of 56.

PIGS

At Yandev there was difficulty in getting Large White sows in-pig and this was blamed on close in-breeding. At Zonkwa the demand for piglets continued to be high. These are mainly for rearing and selling to the south and less frequently for local consumption.

CATTLE MULTIPLICATION CENTRES

1. The year included progress and also setbacks due to the season, unthriftiness and disease.

2. In Bornu, the cattle at Marguba Cattle Multiplication Centre maintained good health. A total of 42 heifers and cows and 7 stock bulls were sold to mixed farmers for breeding.

3. In two of the Kano Cattle Multiplication Centres, Birnin Kudu and Gaya, trypanosomiasis caused concern, particularly in the former centre where blood smears showed up to 50 per cent infestation. There were few deaths, however, and veterinary investigation was intensified. At Gum 1 the condition of the cattle remained good and some young stock bulls were ready for issue, as also at Birnin Kudu.

4. The condition of cattle at the two Katsina Cattle Multiplication Centres remained satisfactory. Six young bulls were issued on loan to local farmers from Kabomo Cattle Multiplication Centre and 17 unsuitable animals were sold off. Kukar Aljanna Cattle Multiplication Centre continued to be run as a heifer pool and 27 in-calf heifers were issued.

5. In Sokoto the water supply at Kotorkoshi was inadequate and the low productivity of the area a handicap. A parasitologist from the Ministry of Animal Health visited the centre and inspected the herd. Poor nutrition and parasites were indicated as the cause of unthriftiness. A total of 13 young bulls for breeding and work and 22 female stock were sold to farmers.

6. The yields at Talata Mafara Cattle Multiplication Centre were depressed by the season but the general condition of the cattle was satisfactory. A total of 7 bulls and 4 heifers were sold to farmers.

7. The higher fertility of Dogondaji Cattle Multiplication Centre assured good crops and adequate fodder. The heifer herd maintained very good condition. A total of 21 down-calving heifers and one calf were sold to farmers in the district. A stock bull was issued on loan to the District Head.

8. In Bauchi, Tumu Cattle Multiplication Centre was run on a care and maintenance basis because of the need to eliminate mastitis and the possible use of the area as an experimental farm. Non-white Fulani cattle were sold. The remaining herd now appears to be free of mastitis.

9. At Darazo surplus young bulls and off-type female stock were sold off.

10. Ndama cattle at the Raav Cattle Multiplication Centre in Benue province improved in condition because of better general management. A total of 40 calves were born and the herd was further increased by the transfer of 54 Ndama heifers and bulls from Ilorin. Distribution to Tiv farmers suffered a setback because a farmer was fined for the negligent loss of a bull and some farmers thereupon returned their bulls stating that they were unable to look after them.

MIXED FARMING

1. Mixed farming continued to increase. Total numbers were difficult to assess as farmers bought ploughs from firms without applying for loans to the Native Authorities.

2. In most expanding areas Native Authorities restricted loans to ploughs only, prospective mixed farmers having to provide their own cattle, but Bauchi Native Authority reverted to full loans for both ploughs and cattle.

3. There were setbacks to expansion. In southern Katsina the spread of trypanosomiasis halted further development. In Adamawa the north bank of the Benue, in Muri and Warkum districts, was found to be a "fly" area.

4. It was difficult to ensure repayment of loans and in Kano this led to the over-expenditure of the Advance Account thus bringing about a long overdue enquiry.

Native Authority Demonstration Farms and Farm Centres

1. These farms vary in their functions and results. In Bornu two model mixed farms of 40 acres each were maintained as examples to local mixed farmers.

2. In Kano the Native Authority Dambatta Farm Centre continued to serve a useful function both in growing Stage 'O' K.50 groundnuts and in the research programme.

3. Of the 6 Native Authority Demonstration Unit Farms in Sokoto province the worst one at Kaura Namoda was closed down. The remainder

were very disappointing. Superphosphate and Fernasan D were demonstrated with varying success.

4. The policy of the three unit farms in Kabba province came under review. The main difficulty has been the production of Satisfactory unit farmers. In Benue province four Native Authority Farm Centres continned with their primary purpose of multiplying seed of improved varieties for distribution to farmers. In addition experiments were carried out.

Unit Farms

1. The two Unit Farms of 10 acres each at Yandev showed a profit once again, in spite of the season.

2. The net profit of the sheep Unit Farm was £91–14*s*–9½*d* and that of the cattle Unit Farm £52–4*s*–4*d*. After deduction of the legitimate expenses of each farmer and his family the net personal savings were £42–17*s*–0*d* and £22–3*s*–11*d* respectively. Both these figures include the £13 "Inspection Fee" which each farmer receives per annum from the Government.

3. These farms have been in existence for about 15 years and now that all useful information has been obtained the farms are to be closed.

4. The experiment has shown that a Tiv family can make a reasonably good living from a 10-acre holding, with 4½ acres fallow, keeping either 8 sheep or 2 head of cattle and increasing the fertility of the land by the use of manure and fertilisers.

PASTURE IMPROVEMENT

1. In Katsina province work continued on the four sites of 50 acres each opened up in 1957. Another 50-acre site near Katsina was selected.

2. At Ladanawa a further 20 acres were stumped, ploughed and sown down to a gamba and kyasuwa mixture. This grew well and made a total of 45 acres reseeded, 5 having been left for observation.

Grass strips sown in 1957 at Modibawa were resown, with good results. The remaining 20 acres were cleared. Reseeding was also carried out at Koka, where kyasuwa was predominant. At Shiroka further harrowing and broadcasting of gamba seed was undertaken to remedy the previous poor growth, Shelter belts of neem and aliera were supplied with little success. The remaining 25 acres were stumped.

3. The new site near Katsina was fenced. Twenty-five acres were stumped, ploughed and sown down to gamba and kyasuwa. Growth was fairly satisfactory. A further 20 acres were stumped later in the season.

4 In Kano province reclaimed areas were declared settlement areas under the Native Authority settlement regulations. The 1957 balance of 170 acres was completed and 610 acres of the 1958 thousand-acre programme were finished by the end of the rains. Work on clearing and ripping 400 acres continued into the dry season. The largest site tackled was that at Dan Zabuwa where 250 acres of dense geza and kalgo "hurmi" were successully cleared, contoured, ploughed and grassed down. In addition 7 other

areas were reclaimed at the same time and 11 established pastures were managed, by controlled grazing, reseeding, bush slashing and weeding.

GOVERNMENT POULTRY

1. A start was made in the importation of day-old Rhode Island Red chicks from the United Kingdom at various centres. Sales of hatching and eating eggs and birds continued. The need for balanced feeding, adequate housing and the complete isolation of established flocks from other poultry continued to be apparent.

2. At Gusau in Sokoto province, the flock was maintained prior to the importation of chicks. Some 2,000 eggs were sold.

3. The Riyom poultry centre continued with the multiplication of the Improved Native bird and comparison of its performance with the introduced Rhode Island Red. In addition investigations into feeding and disease control continued, as did the issue of stock to provincial stations and local farmers.

4. Mature hens of the Improved Native bird now average 5 lbs. body weight and over 140 eggs per annum compared with the local fowl which weighs about 2½ lbs. and produces 50 eggs per annum. This has been brought about by improved feeding and management and severe culling. A total of 568 birds of various ages and breeds were issued and 27,274 eggs were sold or issued free.

5. In Zaria province, cross-bred birds from Riyom found ready buyers but on the whole farmers were reluctant to pay higher prices for Farm Centre birds.

6. At the Minna poultry breeding centre 154 sexed day-old chicks were imported. Losses were largely due to minor faults, since rectified, and by the end of the year 124 pullets were on the point of lay.

7. In Yola better management and feeding brought about a satisfactory increase in poultry numbers and it was not necessary to import birds, as previously. No eggs were issued as the building up of stock received priority.

8. In Benue province the large demand for improved poultry continued. Three main flocks, improved Native Rhode Island Red and Light Sussex were maintained but the last breed is not very popular with local farmers who state that white chicks are easily picked up by hawks.

9. The deep litter unit proved itself an efficient system for egg production. A total of 347 birds and 692 eggs were sold for breeding and 250 birds and 14,931 eggs sold for consumption.

10. In Ilorin province the flock was reassemble after the fowl pox epidemic, and the policy of severe culling was continued.

11. Day-old chicks numbering 498 were received from England in January, 1959. Initial losses were high, partly due to the effects of delay in transit, but subsequent losses were few and growth was satisfactory. Improved stock and 8,988 hatching eggs were sold to farmers.

Ducks

At Riyom and Yandev, exotic breeds of ducks including Aylesbury, Khaki Campbell and Badagri breeds proved disappointing in that the fertility of their eggs continued to be very low. Issues were kept to a minimum in consequence.

Turkeys

In order to see if the size of native turkeys can be improved by the introduction of exotic blood, 50 day-old Broad Breasted Bronze Turkey chicks were flown from the United Kingdom for future crossing at Yandev.

NATIVE AUTHORITY POULTRY UNITS

1. Only limited success was obtained, many of these units being indifferently managed.

2. In Kano the only progress occurred in Hadejia, and the Native Authority was advised to close down all units except that at Dawakin Kudu where the District Council was keen to take it over. Disease, lack of trained staff and administrative difficulties led to failure of the units.

3. No records were available from Sokoto units which continued to be unproductive and financial liabilities.

4. In Adamawa province 298 day-old chicks were received in three batches for the Mubi, Jalingo and Numan units. Losses amounted to 13.4 per cent. The survivors have now reached laying size and egg production is increasing. Eggs sold totalled 1,073.

5. Thirty Light Sussex birds were bought in the French Cameroons to replace the old stock at Gembu.

FERTILIZER CAMPAIGN

1. There are areas where the demand for superphosphate is well established and in these areas there were increasing sales. In the northern touring area of Adamawa 11,200 bags, each of 40 lbs, were issued. In Kano the inclusion of a 20 lb. bag in the standard one acre issue of K 50 groundnut seed boosted sales which reached 15,000 bags.

2. A total of 20,342 bags were issued in Katsina, 3,277 of these being free issues to Stage D cotton growers.

3. In Niger province there was an increased demand for sulphate of amonia for use on rice and 1,177 bags were sold.

4. Total issues amounted to 65,743.5 bags of superphosphate, 4 251 bags of sulphate of ammonia and 452 bags of mixed fertilizer.

5. The organisation and supervision required to run the scheme continued to be undertaken by Field Services staff as only in Southern Katsina did a commercial firm ensure distribution.

6. In many areas farmers were reluctant to purchase fertilizer and there is no doubt that sales would have been much smaller had credit facilities been removed. The collection of repayments continued to be difficult.

Year	*Free Issues— Super and S/A*	*Cash and Credit on Sales. Super and S/A*
1950	30,000	Nil
1951	67,000	25,000 (56 lb bag.)
1952	32,000	23,000 ,,
1953	135	27,806 ,,
1954	64	24,477 ,,
1955	113	28,189 ,,
1956	424	51,977 ,,
1957	2,030	38,987 (40 lb bag.)
1958*	174.5	70,272

(*includes mixed fertilizer—452 bags)

PESTS AND DISEASES

1. Spraying programmes included that of cocoa against black pod and capsids in Kabba, which was very successful. On Lowlands Farm, Plateau province, spraying trials to control cotton stainers were undertaken at a cost of £6-10*s*-0*d* per acre, which was profitable as the sprayed plots yielded some 1,500 lbs. seed cotton per acre. In Benue, Tiv Native Authority sprayed orchards with a mixture of Albolineum, Perenox and Gammalin.

2. The spread of trypanosomiasis in southern Katsina gave cause for concern. In Benue a heavy concentration of tsetse was found near a stream on the new Yandev farm extension. The sides of the stream and its tributary were slashed and cleared.

3. The use of seed dressings for millet, guinea-corn and groundnuts is now routine on Ministry farms. At Daudawa all Stage C and most of Stage D cotton seed of the multiplication scheme was dressed with Agorsan against black arm disease.

4. The principles of crop sanitation particularly relating, to stem borers were explained to farmers by extension workers but with a little success.

5. Native Authorities continued with poisoning campaigns against wild pigs, baboons and monkeys.

QUELEA CAMPAIGN

1. A bird control unit was established to control the Quelea birds whose damage to grain crops was estimated at over one million pounds in 1957-58. Both the traditional method of destroying nests and the modern flame-bomb method of destroying roosts were employed.

2. Some 5,000 acres of nesting sites were involved in the nest destruction campaign by organised village labour, thus reducing the potential bird population by several million.

3. The flame-bomb method accounted for the destruction of an estimated 35,000,000 birds involving 17 roosting sites between January

and March 1959. The total expenditure incurred (excluding capital cost) was about £9,300. It is estimated that the birds reduced by both methods could have accounted for some 121,976 tons of grain during the period. Assuming 25 per cent of this to be cultivated crops and an average price of £20 per ton, the loss to the farmers would have been some £607,880.

SEED DRESSING

1. Despite a definite and increasing demand in certain areas, total sales of Fernasan D were disappointingly low. The reasons for this included poor coverage by the firm concerned and the reluctance of farmers to purchase from canteens.

2. A campaign which included lectures to adult education classes got under way too late owing to a variety of reasons and did not have the desired results.

3. In Bauchi province there were some startling demonstrations of the value of seed dressing in preventing smut, and farmers in northern Katsina commented on the fact that dressed seed could withstand long period of drought. Nevertheless not all the Fernasan 75W, issued as part of the K50 groundnut distribution pack, appears to have been used.

SOIL CONSERVATION AND LAND-USE AREAS

1. Extension work continued with propaganda on soil conservation including contouring, terracing, gulley control and grass and tree planting.

2. In addition certain areas were set aside as special demonstrations, or areas of concentrated communal effort.

3. In Kano some 10 square miles of sheet eroded land have now been protected as part of the Pasture Reclamation Scheme. Small town schemes at Gwaram and Birnin Kudu were completed, with only moderate success in the latter case.

4. A land-use experiment at Shabarawa near Gumel resulted in some 1,000 yards of broad-based terrace made by a Ferguson blade terracer, by the end of March. The shortage of surveyors and Assistants trained in soil conservation checked progress.

5. In southern Katsina several badly devastated areas were tackled while in northern Katsina work was mainly concentrated on the prevention of further erosion in areas where erosion was in its early stages. A third soil conservation course for Native Authority assistants was held at Kafinsoli n September, 1958.

6. In Sokoto province sites at Koko and Maru were selected for soil conservation demonstrations. A water course was built at Maru. At Denge, farmers and Sokoto Native Authority co-operated to build a small cattle dam and continued with the bunding of the hillside. The farmers provided 50 per cent of the required unpaid labour.

7. Soil conservation in Plateau province was largely confined to the Langtang scheme. Some 22,000 acres are now involved. The work, which

started in 1951, was carried cut at an approximate cost of 15*s* per acre. This is probably a misleading figure in that a high proportion of the work was the construction of large and expensive cut-off terraces at the foot of the hills at the back of Langtang town. This construction was by direct labour while the contour bunding of farmland was done largely by communal labour. The interest of local farmers appeared to be waning and it became more difficult to organise communal gangs.

8. In Adamawa province a start was made on the Munda Valley scheme near Mubi. In the upper Munda scheme stone terraces were made on an area of approximately 30 acres at a cost of 5*s*-4*d* per yard. In the lower Munda scheme some 40 acres were covered by graded terraces, most of these discharging into a gulley. In addition to this work gulley control received much attention.

9. Two small pilot schemes were established in the vicinity of Okene in Kabba province. Much persuasion and demonstration were necessary, but a coming awareness of the need for soil conservation in Igbirra Native Authority was shown by the fact that soil conservation laws were passed. A small start with communal bunding was made at the end of the year.

10. A large scheme was started above Gombe town in Bauchi province. Two courses on soil conservation were held for Native Authority staff. Some 140 miles of terraces were constructed giving protection to about 3,000 acres of land including 1,600 acres of farmland.

MINES LAND RECLAMATION

1. Work on the reclamation of old mining dumps continued. On 7 leases worked, 246 acres were reclaimed.

The policy had always been to level the dumps, rehabilitate the soil with compost and cover crops and eventually hand the areas back as farmland. This was altered as Jos Native Authority agreed, on the Ministry's recommendation, that eucalyptus trees should be planted on reclaimed dumps. These trees form a useful income as firewood.

MECHANISATION

1. The demand for fadama ploughing increased in many areas but the reluctance of farmers to pay for ploughing remained. The collection of ploughing fees in advance continued to be the only satisfactory way of ensuring payment.

2. In Bornu satisfactory yields were obtained from the 1958 rice crop grown on 1,467 acres of mechanically ploughed fadama on the Jere Bowl. Ploughing charges of £3 per acre (£4,401) were successfully collected. The cost of ploughing and disc harrowing was £2-18*s*-0*d* per acre.

3. A new ploughing scheme on the Gajibo fadama for the production of rice began in mid-January 1959 when 150 acres were ploughed with a Dragoon disc plough drawn by a D 4 Caterpillar tractor. The cost came to

£3-10*s*-6*d* per acre. A charge of £2 was previously agreed to. The high cost was due to lateness of starting and to the small acreage.

4. The Gwandu Native Authority rice scheme in Sokoto province, financed and staffed by the Northern Region Development Corporation, did not reach its target of 11,700 acres, and only 9,050 acres were actually ploughed. Ploughing charges were increased to £3 per acre and this has not been well received by farmers.

5. In Plateau province the Lowland rice scheme ploughed 1,464 acres in early 1959 and all ploughing charges were paid before the start of ploughing, despite the poor 1958 rice harvest, which left farmers short of cash and seed.

The charge was £3 per acre. The project manager's estimate was £6-4*s*-0*d* per acre, due partly to the small scale of the scheme and partly to the fact that rice fadamas are very scattered and widely spaced. The cost of moving from one fadama to another cost the ploughing unit about £1-6*s*-0*d* per mile. In Zaria province the tractor hiring unit ploughed 292 acres of fadama and 9½ acres of upland in northern Zaria and 209 acres in Kagoro in the Jema'a Federation. In northern Zaria rice yields were average but at Kagoro waterlogging and weeds caused almost a complete failure.

6. In Niger province some 150 acres were ploughed on the uncompleted Tungan Kawo drainage and irrigation scheme, the possible area being limited by lack of flood control. Ploughing charges of £2-5*s*-0*d* per acre were collected by Kontagora Native Authority which was charged by government for the cost of fuel and wages at about £1 per acre plus a sum of £1-10*s*-0*d* per acre to cover depreciation and supervision. The work done was satisfactory and the crops were good. There is an increased demand for ploughing.

7. In Adamawa province a Ferguson tractor visited 5 districts in the northern touring area ploughing 15-20 acres in each place. A total of some 81 acres were ploughed and disced at a cost of £2-10*s*-0*d* per acre, all payable before work started. The cost to the Native Authority including depreciation, was about £72.

8. In Benue province there was a reduced demand for fadama ploughing. Farmers hoped, as before, that the rule requiring payment of ploughing fees in advance would be changed and withheld payment until the last moment. Some finally decided to pay when it was too late in the season and the fadama too wet for ploughing. As a result only 104 acres were ploughed in the main fadamas in Wukari Division but the scheme paid for itself and some profit was made.

EXPERIMENTAL TRACTOR FARM, MBATIE

1. The crops on the experimental tractor farm at Mbatie in Benue province were affected by the general adverse weather. In spite of this considerable progress was made towards the mechanisation of the cultivation of upland crops.

2. Almost complete mechanisation of yam cultivation has been achieved. Labour costs have been considerably cut down and a trial proved that the mechanical lifting of yams causes less damage than hand labour.

3. Several of the operations required for the cultivation of soya beans cereals and benniseed have been mechanised and manure spreading for cereals is being done mechanically.

4. At the end of the 1958 season it was decided to run the farm as an experimental tractor farm and not as an economic tractor unit farm. An experimental programme was devised in consequence.

MOKWA AGRICULTURAL PROJECT

1. The development of the experimental farm continued and a large programme of experiments was carried out. Some 810 acres were mechanically cultivated with Ferguson tractors and equipment. Soil conservation measures continued in East Ndayako and Dangape. Work was completed in the former area.

2. Experiments with cotton and *urena lobata* were encouraging. An average yield of 343 lbs. per acre was obtained from 100 acres of cotton and 102 acres of *urena abata* yielded 800 of fibre per acre (18 per cent fibre). These yields, although low, can be considered promising in a year of very low rainfall.

3. The number of settlers remained unchanged and the cultivation of the area continued to be carried out by direct farming methods.

4. The rainfall was the lowest for many years and there was a dry period of 44 days just after the main crops had been planted. As a result yields of all crops were very poor. The average yield of groundnuts was 448 lbs. per acre, Farafara guineacorn 382 lbs. per acre and Kaura guineacorn 119 lbs. per acre.

5. Cash returns were therefore low and 18 farmers were in debt by the end of the year. A total of 26 tenants decided to remain and one more was taken on.

6. An experiment was conducted on the possibilities of fattening cattle bought in the north for subsequent sale to southern markets. A total of 42 cattle were involved. Selling proved very difficult and after they had been at Mokwa for eight months it was decided to sell them quickly at the best price, which averaged £23 per beast. This was not sufficient to show a profit and the account showed a loss of £145.

IRRIGATION SCHEMES

1. These schemes are designed to be self-supporting. The collection of water rates was difficult and emphasised the need for stricter financial control.

2. In Sokoto province the Kwarre scheme was in danger of being put out of operation because of vegetation blocking the drainage and irrigation channels and the protective diversion ditch. The Wurno scheme, due to

come into operation next season, was not declared a Native Authority settlement area though agreement was previously reached on this point.

3. The response to irrigation schemes in Kano province was very disappointing, despite the fact that rice and dry season crops were grown successfully on a demonstration plot at Tomas.

4. In Niger province the Bida irrigation schemes management committees met quarterly to decide on policy and to instruct the managers. Water rates continued at £1 per acre. Farmers' committees which met at fortnightly intervals at first, tended to meet at longer and longer intervals later. This, coupled with slackness in other directions, proved a danger to the future of the schemes and measures had to be taken accordingly.

5. Scheme managers were required to submit detailed estimates for approval by the management committee and unapproved expenditure was not allowed. However, two continuing weaknesses, the lack of an economical attitude towards expenditure and the persistent unwillingness of the manager and Native Authority to insist on payment of water rate by the duly appointed date, prevented these schemes from being completely self-supporting and successful.

FIRKI BUNDING

1. In Bornu water-retaining bunds on "firki" soil were made using a D4 Caterpillar tractor. After breaking up the heavy soil with a cultivator, a Dragoon plough was used to make bunds 18 inches high. A total of 400 acres was enclosed in Dikwa Division at an average cost of 17*s*-10*d* per acre, though the cost varied from 13*s* per acre at Gajibo where 30-acre blocks were enclosed to 22*s*-6*d* per acre at Ngala where 10-acre blocks, needing close bunding, were enclosed. The cost per cubic yard of soil moved was 5*s*-11*d*.

2. Local farmers expressed complete satisfaction with the work done.

AGRICULTURAL SHOWS

1. These were held in all provinces and most divisions, and totalled 55. As a result of work by Ministerial extension staff, by helping and advising Native Authorities where appropriate, and by providing show stands, demontrations and exhibits, the emphasis on agriculture increased.

2. The quality and amount of exhibits naturally varied. In some of the Plateau shows there was plenty of produce but no cattle, while in some Bauchi shows cattle exhibits greatly outnumbered produce.

3. Twenty district ploughing matches were held in Kano province, the final taking place in Kano where the Emir gave out the prizes.

LEGISLATION AFFECTING AGRICULTURE

1. Many Native Authorities adopted the "Rules for the Control of Soil Erosion" which were proposed by the Ministry. Fewer adopted the regulations designed to control the activities of middlemen dealing in cotton and groundnuts.

2. Regulations on the Cotton Close Season and on the Control of Domestic Animals were, in some cases, indifferently enforced.

SUMMARY

1. The season was a poor one and both food and export crops were adversely affected, particularly the latter. The harvest was better than expected, however, as late rains, and in some cases increased acreages, helped to raise total yields. There was no general food shortage.

2. The large programme of investigations and surveys continued and valuable information was obtained for formulating recommendations to farmers.

3. The senior staff position was generally satisfactory but the junior staff position continued to be most unsatisfactory. Contact with the farmer remained the weakest link in the chain and unless recruitment improves this will continue to be so for some years.

4. Export crop figures for 1958-59 are subject to confirmation.

GLOSSARY

Fadama	Swamp land subject to inundation
Firki	Black cotton soil
Gamba	*Andropogon Gayanus Kunth*
Geza	*Combretum Micranthum G. Don*
Hurmi	Land reserved for communal purposes (grazing or forest)
Kalgo	*Bauhinia Thonningii Schum*
Kyasuwa	*Pennisetum Pedicellatum Trin*
Neem	*Melia Azedarach Linn.*

Part II—Produce Inspection Division

INTRODUCTION

In order to present this report in as readable a form as possible, all statistics have been compiled in tabular form and appear at the end of the report (as they did in last years).

It is felt necessary, in these introductory remarks, to point out that although this year's figures for the two major export crops of the Northern Region, groundnuts and cotton, fall well below last year's record ones, they still approximate to the average figures for the last five years.

FESTIVAL OF KANO

During December, January, and February, headquarters staff was involved in a considerable amount of extra work, in connection with the Festival of Kano. The division was asked to prepare (in collaboration with other sections of the Ministry) an exhibition stand, which would arouse the interest of the public in the important and exacting work carried out by the Ministry.

At the Festival, the Produce Inspection Division stand proved to be (by public opinion and specific comment) one of the many successes on view.

As the stands aroused so much interest, and were so well presented it was decided that the public should be afforded another opportunity of seeing them at the Self Government Celebrations which were to be held at Kaduna in April.

STAFF

Details of the establishment for the year under review, the strength at the beginning and end of this period, and vacancies existing at 31st March, 1959 are shown in Table 1.

There has been a drop in the number of senior service officers in the Division, this was caused by the transfer of Mr W. S. Sawyer, Accountant, to Kaduna.

It will be noted that there is an extra vacancy for a Produce Officer, this was created by Mr F. E. N. Rose's promotion to Senior Produce Officer which brings the establishment and strength of Senior Produce Officers up to two. Three Agricultural Superintendents, Messrs Kinross, Walker and Rees, were seconded to the division in November, 1958 to assist with the checktesting of groundnuts.

Mr Kinross was posted to Katsina; Mr Walker to Kaugama (to cover the Nguru line) and Mr Rees was stationed in Kano.

The number of direct entries into the Produce Inspector/Assistant Produce Inspector grade, was nine; compared with twenty-two in the previous year. This comparatively small intake coupled with resignations, dismissals, and promotions, plus an increase in establishment caused the number of vacancies to be increased to twenty-four.

No further appointments of Native Authority Cotton Examination staff were made during the period. The establishment figure for Produce Examiners, however, was increased from 119 to 176, creating vacancies for 66.

ADMINISTRATION

In its first full year as an integral part of the Ministry of Agriculture, the internal administration of the division remained very much the same as in previous years with Divisional Headquarters at Kano and seven area headquarters at the following places:—

Kano, Funtua, Gusau, Maiduguri, Gombe, Zaria and Lokoja.

Once again Gombe was treated as a seasonal station and a Produce Officer was posted there from the 8th November, 1958 to the 31st March, 1959.

All areas were continuously supervised by officers not below the rank of Acting Produce Officer, with the following exceptions:—

Lokoja—vacant	11-7-58 to 15-8-58
	23-10-58 to 29-10-58
Funtua—(no resident Produce Officer)	10-4-58 to 8-10-58
(supervised from Zaria)	9-3-58 to 31-3-59

During the season all senior officers from headquarters and from the area offices toured extensively. This fact, coupled with the checktesting activities of the seconded Agricultural Superintendents, contributed to the effective supervision of the work involved in marketing the export crops of the Northern Region.

GAZETTED PRODUCE INSPECTION STATIONS AND MARKETS

There were 437 Gazetted Produce Inspection station and markets in the 58/59 season as compared with 410 in the previous season.

This increase of 27 was due to an increase of 38 in the number of cotton, cocoa, palm-oil, palm kernels markets and a decrease of seven and four respectively in the groundnut and capsicum markets.

These markets and inspection stations are gazetted by the Secretary of this division, following recommendations by the Northern Region Produce Inspection Advisory Committee.

The numerical strength of the different types of markets and inspection stations, and their Provincial distribution can be seen by referring to Table 2.

GROUNDNUT SEASON

The 1957/58 season closed on the 30th May, 1958 and the 1958/59 season opened on the 7th November, 1958, for Kano area, and on the 14th November for Rivers Area groundnuts. The season was still open at the close of the year under review.

Special Grade

The Northern Region Marketing Board's scheme, which started three years ago, again proved successful, and 99.7 per cent of the groundnuts bought were eligible for the Special Grade premium of £5 per ton.

Special Grade groundnuts were again defined as groundnuts of exportable quality containing not less than 70 per cent whole nuts by weight.

Rivers area groundnuts were once again automatically considered as Special Grade and awarded the £5 premium.

The increase in the percentage figure from 95.3 per cent to 99.7 per cent is creditable, but it is probably even more so when the method of grading used this year is compared with the visual system used last year, when a certain degree of tolerance was inevitable.

At the end of last season the Northern Region Marketing Board indicated that they were not completely satisfied with the visual test and requested the division to revert to the more accurate and exacting test, which was used in the 56/57 season. With this method a bag sampler was used to sample each bag, the resultant sample being gently mixed by hand, quartered, and from one quarter a 10-ounce sample was accurately weighed out. This 10-ounce sample was then sorted out into whole nuts and broken nuts, a special mesh sieve being used to speed up the operation. The whole nuts were then weighed and if the weight was 7 ounces or more, the consignment was declared special grade and sealed with a special seal.

The excellent results obtained this season were due to:—

(*a*) The high premium paid for Special Grade nuts;

(*b*) The continued use of hand and power driven decorticating machines;

(*c*) The propaganda issued as regards the correct use of these machines;

(*d*) The attitude of the Licensed Buying Agents, wherein they would rather hold back prospective Standard Grade nuts and refine them until the required 70 per cent whole nut content was attained.

Grading was again carried out in Gazetted Inspection Stations only.

Purchases

As mentioned in the introductory notes this year's crop can be regarded as a good average one.

Brief comparative figures are given below, for more detail refer to Table 3.

Total purchases in Tons				*Decrease*
1955/56	1956/57	1957/58	1958/59	
514,073	349,466	690,289	521,321	168,968

Price

(*a*) *Kano Area.*—The basic ex-scale port of shipment prices for the 1958/59 season were as follows:—

	Per ton £ s d
Special Grade	43 6 6
Standard Grade	38 6 6

Prices at Gazetted Inspection Stations or buying points were based on the above port prices, less rail and road differentials.

Buying prices were again subject to the deduction of £1 per ton Produce Sales Tax.

(*b*) *Rivers Area.*—The arrangement of previous seasons under which the Rivers Area was divided into a number of price zones was not continued for the 1958/59 season.

The buying prices at individual buying stations was determined in the same manner as in Kano area.

The usual 10 per cent checktest was carried out on all groundnuts evacuated to port or transferred to oil expressors in Kano.

This checktest is to ensure that the groundnuts, are of exportable standard, i.e., containing not more than 1 per cent extraneous matter of which not more than 0.2 per cent may be stones, laterite, or other mineral content.

Table 4 shows that 645,730 tons were subjected to such tests during the year as compared with 379,221 tons the previous year.

In addition to the above checktest all groundnuts are subjected to an inspection test on arrival in a Gazetted Inspection Station to ensure that only bags with a whole nut content of 70 per cent or over are sealed and passed as Special Grade.

Table 5 gives details of the total amount of 500,776 tons of Special Grade nuts graded by the division from the opening of the season to the end of March.

The whole nut content of Standard Grade purchases varied between 30 per cent and 70 per cent. Groundnuts with a whole nut content of less than 30 per cent were rejected as unsuitable for export.

Routine storage inspections were carried out throughout the year on all groundnuts awaiting evacuation to port, to ensure that pest infestation and deterioration was kept to an absolute minimum. As a result of these inspections, comprehensive records were compiled for each pyramid and store in order to check claims submitted by the Licensed Buying Agents for deterioration in their stocks.

Quality

The result of laboratory tests carried out at Kano to ascertain the average impurity content of groundnuts is given below. Comparative figures for the previous two years are included in the table—

Season	*Percentage of Stone*	*Percentage of Shell*	*Percentage of Total impurities*
1956-57	.157	.241	.398
1957-58	.152	.201	.353
1958-59	.150	.210	.360

It will be noted that there is a slight increase in the total impruities as compared with last year, but a slight decrease in the stone content. This latter fact is rather suprising as a comparatively large number of parcels were detained during the latter part of the season for picking (removal of stones and other impurities) or for prosecution.

In one noted case at Ringim, a parcel was found to contain 15.6 per cent stone.

Average figures for other tests carried out in Kano Laboratory are as follows:—

	Percentage
(*a*) Oil content	49.38
(*b*) Free Fatty Acid	1.39
(*c*) Moisture content	4.07
(*d*) Whole nut	70.810

Standardisation and Packing

Standardisation was satisfactory throughout the year with the exception of one or two specific cases. One of the worst instances was a deliberate attempt by a storekeeper at Mallam-Maduri to rail bags which were as much as 5 lbs short of the required weight.

The quality of the bags used, and the standard of marking and sewing witnessed in the Kano Area during the year left a lot to be desired.

Reports from other areas indicate that this problem was specific to Kano.

Storage

373 pyramids and 20 stores were used to store the 1958-59 crop as compared with 386 pyramids and 31 stores used in 1957-58.

All pyramid plinths were inspected and approved before use. All pyramids were stacked on a base on sisalkraft paper with the exception of a few pyramids where a bitumenised roofing felt was used experimentally.

At the beginning of April, 1958 there were 417,642 tons of the 1957/58 crop at railhead awaiting evacuation.

At the beginning of November, 1958 when the 1958/59 crop season opened, this figure had been reduced to 91,721 tons, and this was cleared before the end of February, 1959.

There was a total of 317,105 tons awaiting evacuation at railhead at the end of March, 1959.

Railment

Total tonnage railed during the year under review amounted to 531,912 tons, of this 364,620 tons were old crop (57/58) and 167,292 tons 58/59 crop.

This railment figure is far greater than the previous years, which amounted to 336,990 tons.

Deterioration

Deterioration for the year came to 345 tons, as compared with 106½ tons the previous year. Although this figure appears to be comparatively high, it must be remembered that the record crop of 57/58 caused a larger tonnange to be stored for a longer period than usual. The 1958/59 figure compares very favourably with the 1956/57 and 55/56 figures which were 514 and 578 tons respectively and is indicative of a steady improvement in storage conditions and supervision.

Pest Infestation

The Senior Pest Control Officer's report is attached.

During the year, infestation of groundnuts by *Trogoderma Granarium* were as follows:—

	Tons
April to November, 1958 (57/58 crop)	40,563
January to March, 1959 (58/59 crop)	942
	41,505

The total figure for the previous year was 11,492 tons which was 2.7 per cent infestation as compared with 4.4 per cent for this year. This comparatively large increase was predicted in last year's annual report and was caused mainly by the larger tonnage of groundnuts in storage and the consequent risk of cross infestations.

The use of groundnut husk as dunnage for some of the pyramids built towards the end of the 1957/58 year, is considered to have had some influence on the increased infestation as well.

Groundnuts for Local Oil Expressors

Groundnuts released by the Northern Region Marketing Board to the four Oil Expressors in Kano during the year 1958-59, amounted to 106,283 tons, of which 77,261 tons were 57/58 crop and 29,022 tons were 58/59 crop.

A total of 87,627 tons was released the previous year.

The above figures are based on those supplied by the Northern Region Marketing Board's Agents for Oil Expression and full details are contained in Table 6.

Groundnuts Ex-Subsidy Stations

There were no subsidy stations during the 1958-59 crop season.

Rivers Area Uninspected Groundnuts

10,367 tons were purchased during the 1958-59 season (up to the 26th March) as compared with 23,031 tons in the previous record year.

Table 3 shows Provincial distribution details of Rivers Area purchases and gives comparative figures for the previous year.

French Groundnuts

Table 7 gives monthly railment figures for the past three years. These nuts are not subjected to impurity tests, but they are subjected to inspection whilst in storage to guard against pest infestation.

A similar system was employed in checking documents, etc., as was used last year. This was done by Kano headquarters.

Kano Laboratory

Analyses of groundnut samples were undertaken throughout the year at the laboratory at Kano. The average results of these tests have already been quoted in a previous chapter.

The number of analyses carried out were:—

Mechanical	221
Chemical	221
Total	442

This is about twice the number of tests carried out in 1957-58 (244).

COTTON

Opening and Closing Dates of Seasons

The season opened on various dates, the earliest being 21st November, 1958 in northern Katsina and the latest being 9th January at certain markets in Benue.

A similar scheme to that which was started last year, was again operated during 1958/59 as regards the closing date of the season.

The closing date was gazetted as 27th March, 1959, but due to the late cotton harvest in Kabba Province, the Resident recommended that the season should be extended to the 10th April, his recommendation was supported by the Licensed Buying Agents, the Senior Agricultural Officer, Kabba and the Produce Officer, Lokoja.

Similarly it was recommended that the Ilorin markets (Babana and T/Jato) remain open until the 31st March.

Cotton Market Materials

A similar arrangement existed as fo last year. Produce Officer, Zaria prepared boxes for Zaria, Funtua, Gusau, and Lokoja 26C markets. Maiduguri and Gombe were responsible for the preparation and distribution of their own boxes.

The Produce Officer, Lokoja was responsible for preparing materials for use in the Benue Ungraded Markets.

Cotton Markets: Design and Construction

Thirteen permanent steel frame cotton markets structures were erected during the year, bringing the total in use up to 53. These are distributed as follows:—

Kano Area	3
Gusau Area	14
Zaria Area	8
Funtua Area	28
Total	53

The traditional type of market was as usual, constructed by the Native Authorities and on the whole the construction and workmanship was reasonably well done.

Reports indicate however that the markets in Sokoto and Adamawa were considerably below the standard of those in other provinces.

The method initiated during the 1956/57 season of financing the Native Authorities for erecting and staffing cotton markets was continued during the 1958/59 season, and again proved to be far more economical than the old reimbursement method.

Cotton Classes

Prior to the opening of the cotton season, cotton classes for cotton examiners were held at various dates, at the following centres:—

Kano, Zaria, Kontagora, Bida, Misau, Gombe, Numan, Gusau, Funtua, Dutsin-Ma, Lokoja, Mallam-Fashi and Damaturu.

Buying Arrangements and Prices

The Licensed Buying Agents of the Northern Regional Marketing Board were the same as last year, mainly. British Cotton Growers Association, United Africa Company, John Holts and Company, P. S. Mandrides, S.C.O.A., C.F.A.O., London and Kano Trading Company, G. B. Ollivants, Patterson Zochonis, C. Zard, Alhaji Gajere, Alhaji Yakubu, H. Hallowi, and Olude Stores.

Licences to buy seed cotton were issued by Kano headquarters and a total of 667 licences were granted to individuals buying for Licensed Buying Agents.

As for last year, prices were based on a zonal flat price according to the ginnery zone in which the market was situated.

These prices, after a deduction of a Produce Sales Tax of one-tenth of a penny per pound were as follows:—

Kuru, Funtua, Gusau, Mallam-Fashi, Lokoja

Grade I	6.0*d* per lb
Grade II	5.5*d* per lb
Grade III	5.0*d* per lb

Mai-inchi, Kontagora

Grade I	5.9*d* per lb
Grade II	5.4*d* per lb
Grade III	4.9*d* per lb

Gombe, Kumo, Misau

Grade I	5.8*d* per lb
Grade II	5.3*d* per lb
Grade III	4.8*d* per lb

Benue

Ungraded	4.9*d* per lb

Staffing of Cotton Markets

Table 8 shows the number of Native Authority Cotton Examination Staff and Produce Inspection Staff who carried out grading and supervisory duties in cotton markets in the various Produce Inspection Areas during the 1958-59 year.

These figures do not include any one above the rank of Produce Inspector Grade II as it is considered that the duties of such personnel were not solely restricted to cotton markets.

Supervision of Cotton Marketing

Cotton markets were again supervised by headquarters officers, Area Produce Officers, Assistant Produce Officers and in some areas by the seconded Agricultural Superintendents. Native Authority cotton supervisors and Produce Inspectors acting as cotton supervisors toured their markets throughout the season and on the whole they did their job reasonably well.

Standard of Work of Cotton Examiners

It is evident from reports and observations that it is only the constant supervision of the above listed officers which kept the standard of work of cotton examiners at a reasonable standard of efficiency.

Even with this constant supervision, reports, were received from most areas concerning cases of bad grading, bad record keeping and general laxity.

Purchases

As indicated in the introductory remarks, this year's crop could be regarded as a good average crop. The tonnage purchased during the year amounted to 85,350 tons as compared with last year's record crop of 120,245 tons.

The various breakdowns of the 1958-59 purchase figures can be found in the following tables which appear at the end of this report.

Table 9 shows how the total purchases were divided between grades and Produce Inspection Areas.

Table 10 shows the provincial distribution of total purchases with comparative figures for the previous season.

Table 11 gives a precis of the purchases for the past four seasons (in grades) with the appropriate percentage.

Quality

The term quality is used in this paragraph as regards the absence of trash, stain, and freedom from unexpanded bolls, and not as spinners and other consumers would understand the term.

From the Produce Inspection point of view there has been a slight improvement in most areas in the quality of this season's cotton.

It is felt necessary here to emphasize that:—

(*a*) The improvement is only slight.

(*b*) The actual quality of the cotton is not accurately reflected in the grading percentages, which this season stand at 80.2 per cent of the total crop grade I, 16.2 per cent grade II and 3.6 per cent grade III.

(*c*) There is still plenty of room for improvement.

Downgrading

Total downgrading for the 1958-59 season amounted to approximately 70½ tons as compared with 78 tons the previous season.

This comparatively large tonnage (last year's figure was for a record crop) bears out the remarks made in the paragraph on standard of work of cotton examiners.

Table 12 shows the various downgradings divided into Produce Inspection Area and the comparative totals for the previous season.

Marketing

Generally speaking the marketing of the 1958-59 crop was carried out satisfactorily.

The usual delays and difficulties were reported, the main ones being caused by lack of cash, and the use of small, poor quality bags, but these local mishaps were soon overcome with the co-operation of the Licensed Buying Agents.

Once again middlemen were extremely active and much of the responsibility for poor grading and other bad marketing practices can be attributed to them.

Evacuation

Evacuation of the crop from markets to ginneries was carried out satisfactorily.

Minor delays and difficulties were experienced in Gombe and Funtua areas. These were caused by the bad condition of some of the dry season evacuation roads.

Ginneries

Reports from all areas, except Lokoja, indicate that ginning commenced in late December–early January, and proceeded smoothly and that storage conditions at the ginnery dumps were adequate.

Lokoja reported that the ginnery is now to all intents and purposes a new one. The baling press is a new design and to a great extent automatic.

Unfortunately, it has suffered from teething trouble, and production, which started in mid March, has been on a reduced scale with a resultant congestion in the dumps, which was considerable despite the relatively poor season.

The storage conditions at the Lokoja dump are very inadequate and an effort is being made by the United Africa Company Manager and British Cotton Growing Association Engineer to rectify this.

BENUE SEED COTTON

Purchases of Benue seed cotton amounted to 1,359 tons for 1958-59 as compared with 2,500 tons the previous year.

Details of monthly purchases and comparative figures for 1957-58 are contained in Table 13.

Buying Arrangements and Prices

The United Africa Company and John Holts and Company, were again the Licensed Buying Agents for Benue seed cotton. The price paid after deduction of a Produce Sales Tax of one-tenth of a penny was 4.9*d* per lb, the same price as was paid last season.

Markets and Marketing

There were 15 markets operating during the season as compared with 13 last year. Construction was the same as last year except that a slight modification had to be made to the bagging yards and buying sections to accommodate two Licensed Buying Agents.

There was a slight alteration to last year's arrangements as the two Licensed Buying Agents concerned decided to buy competitively at all the markets (last year, the Licensed Buying Agent per market system was in operation).

The co-operatives were again active in most places and their collections and purchases were eventually handed to the United Africa Company.

Staff

A slight improvement was apparent in the work of the cotton examiners in Benue markets. This was attributed to the fact that most examiners are gaining confidence with experience.

Quality

No marked improvement over last year's standard.

Evacuation

Owing to the fact that ginning did not commence until the latter half of March there was considerable congestion in both Holts and United Africa Company ginning dumps.

So much so that in the case of United Africa Company evacuation from the markets had to be delayed.

CAPSICUMS

The drop in the figure for capsicums purchased during the year continued, and only 52 tons were graded at the Gazetted Inspection Station at Funtua.

The marked decrease in total purchases is evident by reference to the comparative figures for the last three years.

Year	*Tons*
1956-57	250
1957-58	100
1958-59	52

The whole of the 52 tons was grade II. The reason for this reduction in the amount graded in the north, is that most of the buyers evacuate their capsicums to port ungraded, and have inspection carried out immediately prior to shipment.

PALM KERNELS

Palm kernel production continued to increase, as can be seen from the comparative figures given below:—

Year	*Tons*
1956-57	12,696
1957-58	13,070
1958-59	16,459

Good crop yields and increased production at the oil mills have been the main contributory factors to the increase.

Full details of monthly purchases are given in Table 14.

Marketing and Quality

The 1957-58 season closed at midnight 25th-26th December, 1958, and the 1958-59 season opened at midnight 1st-2nd January, 1959.

The minimum produce price remained at what it was in the 1957-58 season, i.e., £30 per ton ex-scale at port of shipment after the deduction of £1 per ton Produce Sales Tax.

Quality was again satisfactory and there were no prosecutions in respect of substandard produce.

Evacuation

There was some congestion at Idah due to the very heavy tonnage handled. Shipping facilities were doubled and by the beginning of the year the congestion was cleared.

PALM OIL

Purchases and Grading

A total of 1,916 tons palm oil was purchased during the year, as compared with 1,933 tons last year.

The decrease of 17 tons is due to the fact that the local market price is higher than the export price, and producers find a ready market for this commodity throughout the Region.

Full details of monthly purchases by grades appears in Table 15 with comparative figures for 1957-58.

Marketing and Quality

The season opened at midnight 1st/2nd January, 1959. The prices paid for the various grades were unaltered and were as follows:—

	Per ton £
Special Grade Palm Oil	54
Technical Palm Oil, Grade I	45
Technical Palm Oil, Grade II	38
Technical Palm Oil, Grade III	30

These prices were subject to a deduction of £1 per ton for Produce Sales Tax, and varied at buying stations with the amount of Road/Rail/River transport differential.

As in previous years, no Technical Palm Oil below Grade I quality was purchased.

Quality was satisfactory and there were no prosecutions for adulteration.

Evacuation of this commodity provided no problem and proceeded satisfactorily.

COCOA

Purchases and Gradings

The cocoa season promised to be a record one, and a crop of as much as 750 tons was at one time thought to be possible. Up to January, this prediction looked as if it would be substantiated, but in the latter months of the year purchases dropped rapidly, and the final figure for the 1958/59 crop was 556 tons. Despite the disappointing finish however, the 1958/59 season proved to be one of the best since the Lokoja area was formed in 1954.

Full details of purchases by grades for 1958/59 are contained in Table 16, together with comparative figures for 1957/58.

Marketing and Quality

The 1958/59 season opened at midnight 11th/12th September, 1958.

Prices of cocoa, naked ex-scale at port of shipment were the same as last year.

	Per ton £
Main Crop and Light Crop, Grade I	150
Main Crop and Light Crop, Grade II	135

These prices were subject to a deduction of £4 per ton Produce Sales Tax and varied at buying stations with the amount of Road/Rail/River transport differential.

The greater part of the crop was again Main Crop, Grade I and the quality was satisfactory.

Storage and Evacuation

No storage difficulties were reported at the up country and Lokoja Depot Stores.

Evacuation form deport stores to Burutu was regular and fast, but undue delay in transferring the stocks from Burutu stores into ocean going vessels caused a considerable amount of deterioration in stocks and 663 bags had to be downgraded as follows:—

418 bags originally MC I to MC II
244 bags originally LC I to LC II
1 bag originally LC I to No Grade

Deterioration certificates to cover the loss in value were issued to the respective Licensed Buying Agents.

BENNISEED

The voluntary inspection scheme, instituted by this division in 1956, was again put into operation and appeared to work satisfactorily.

The inspectors were alive to what was required of them, and the buyers endeavoured to co-operate.

PROSECUTIONS

The following is a summary of prosecutions during the year.

Cases Tried	*Acquitted*	*Pending*	*Conviction*	*Sentences*
10	—	3	7	£68:5:0 *fines*, 6 *months imprisonment*

ERECTION AND MAINTENANCE OF TEMPORARY BUILDINGS

Erections

(*a*) Materials for the erection of a temporary garage were purchased at Maiduguri at a cost of £48–15*s*–0*d*.

(*b*) The building was not completed due to lack of funds.

Maintenance

Maintenance costs on existing buildings amounted to £136–16*s*–4*d*:—

	£	s	d
Gusau	93	9	3
Gombe	42	17	1
	£ 136	6	4

THE PEST CONTROL UNIT

The principal activities of the Pest Control Unit were again centred about the control of insects and rodents infesting Northern Region Marketing Board produce.

The year has been a bad one, and the tonnage of groundnuts affected by *Trogoderma* has been high. This is attributed to the fact that a larger tonnage than usual had to be stored, and consequently there was a greater risk of cross infestation.

The total tonnage infested during the year was 41,505 tons as compared with 11,492 tons last year.

Spraying Machines

The Lister Machines (SS2 and SS4) continue to be used for routine spraying. The Allman Model 100 spraying machine which was tested during the season proved unsuitable for the various duties it has to perform. In view of this, three new Lister Machines have been ordered.

Motoblo Misblower

These machines have been proved very satisfactory and are being used in Kano and in line stations for dusting operations.

Swingfog

During February, March and April—the period of intensive night flight by *Tribolium Castaneum*, Swingfogs were tried out in place of the cumbersome tod insecticide fog applicator. Operations were started as usual and ceased when all pyramids were covered in late March to mid April.

Prophylactic Measures

The four spraying terms continued throughout the year on routine spraying and dusting, and these measures continue to prove satisfactory.

Groundnut Cake

Trogoderma infested groundnut cake from French Territory continues to arrive in Kano, but with the co-operation of the transit firm, the cake is fumigated as soon as possible after its arrival to prevent cross infestation. This service is charged for the Northern Region Marketing Board.

Experiments

Experiments with Sisalkraft Paper and Ruberiod continue in co-operation with West African Stoud Products Research Unit.

Experiments on different methods of dusting and spraying have also been carried out with West African Stoud Products Research Unit.

Rodent Control

The use of "Warfarin 5 K" continues and is proving successful. The percentage kill is however difficult to assess owing to the migrating habits of the rodents involved. A full kill having been effected, fresh arrivals quickly colonise the old runs.

Grain (Guineacorn)

The division has been given the task of storing 3,040 tons of grain for the government in the following locations:—

Kano 1,844, Funtua 396, Gusau 800 tons. A considerable amount of work has been put into the preparing of stores, i.e., laying Sisalkraft Paper, spraying and dusting and finally fumigation with Methyl Bromide when the grain has been finally stacked. It is hoped that this will enable the grain to be kept in good condition for a few years.

MAINTENANCE OF VEHICLES AND EQUIPMENT

The division's vehicles and equipment continue to be serviced by the workshop staff, which has coped with all breakdowns which have occurred. The maintenance of a divisional repair unit continues to prove its value.

FESTIVAL OF KANO

The division gave an exhibition of its work at the Festival of Kano. The public was very interested and the Resident, Kano, congratulated the staff responsible for such an excellent show. This show was also put on at Kaduna during the Self-Government Celebrations.

Table 1.—Staff—Establishment and Strength—1-4-58 to 31-3-59

Post	*Establishment 1958-59*	*Strength at 1-4-58*	*Strength at 31-3-59*	*Vacancies at 31-3-59*
Secretary	1	1	1	—
Principal Produce Officer	1	1	1	—
Senior Produce Officers	2	2	2	—
Produce Officers	9	7	7	2
Accountant	1	1	—	1
Executive Officers	2	1	1	1
Senior Pest Control Officer	1	1	1	—
Pest Control Officers	2	1	1	1
Assistant Produce Officers	23	15	14	9
Produce Inspectors, Grade I	27	26	35	—
Produce Inspectors, Grades II and III and Assistant Produce Inspectors	164	149	140	24
Produce Examiners	176	106	110	66
Chief Clerk	1	1	1	—
Assistant Chief Clerk	1	2	1	—
First Class Clerks	9	7	8	1
2nd and 3rd Class Clerks, Ungraded Clerks and Clerical Assistants	33	26	28	5
Accounting Assistant	1	1	1	—
Driver Mechanics	3	3	3	—
Motor Drivers	4	4	2	2
Telephone Attendant	1	1	1	—
Messengers	13	13	12	1
Night-Watchmen	8	8	7	1
Stores Assistant	1	1	1	—
Fumigation Foreman	1	1	1	—
Pest Control Assistants	6	6	6	—
2nd and 3rd Class Technical Assistants	1	—	—	1
Stenotypist, Grade I, II or III	1	—	—	1

Table 2.—Table showing Provincial Distribution of all Gazetted Inspection Stations and Markets for 1958–59 Season, with Comparative Totals for 1957–58 Season

Produce	*Adamawa*	*Bauchi*	*Benue*	*Bornu*	*Ilorin*	*Kabba*	*Kano*	*Katsina*	*Niger*	*Plateau*	*Sokoto*	*Zaria*	1958-59	1957-58	*Increase*	*Decrease*
Groundnuts	—	1	—	13	—	—	23	11	2	2	8	3	63	70	—	7
Cotton Markets—including Benue Ungraded	21	47	11	19*	2	12	17	60	31	10	50	46	326	300	26	—
Capsicums	—	—	—	—	—	1	—	1	1	1	1	1	6	10	—	4
Cocoa	—	—	—	—	2	12	—	—	—	—	—	—	14	10	4	—
Palm Oil	—	—	—	—	2	12	—	—	—	—	—	—	14	10	4	—
Palm Kernels	—	—	—	—	2	12	—	—	—	—	—	—	14	10	4	—
Totals	21	48	11	32	8	49	40	72	34	13	59	50	437	410	38	11

*2 Markets gazetted but not opened.

Table 3.—Comparative Purchases of Groundnuts by Provinces (up to 26th March, 1959)

(a) *Kano Area (Special and Standard Grades)—in Tons*

	1958-59			1957-58				
	Special	*Standard*	*Total*	*Special*	*Standard*	*Total*	*Increase*	*Decrease*
Kano	267,240	702	267,942	336,587	8,774	345,361	—	77,419
Katsina	77,322	68	77,390	89,811	3,945	93,756	—	16,366
Sokoto	59,628	51	59,679	79,059	2,349	81,408	—	21,729
Zaria	11,502	360	11,862	10,572	2,334	12,906	—	1,044
Bornu	70,763	343	71,106	96,393	9,818	106,211	—	35,105
Bauchi	17,022	—	17,022	9,553	3,952	13,505	3,517	—
Plateau	5,487	—	5,487	13,408	30	13,438	—	7,951
Niger	444	22	466	673	—	673	—	207
Total	509,408	1,546	510,954	636,056	31,202	667,258	3,517	159,821

Overall decrease 156,304

Percentage of Special Grades for 1958-59 = 99.7

(b) *Rivers Area (All Special Grades)—in Tons*

Province	1958-59	1957-58	*Increase*	*Decrease*
Benue	764	1,283	—	519
Adamawa	7,725	17,052	—	9,327
Niger	123	162	—	39
Bauchi	301	2,415	—	2,114
Bornu	210	412	—	202
Sokoto	—	—	—	—
Plateau	1,244	1,707	—	463
Kabba	—	—	—	—
Total ...	10,367	23,031	—	12,664

Kano Area ... ... 156,304 Decrease
Rivers Area ... ... 12,664 Decrease

Total Decrease ... 168,968

Table 4.—Tonnages Inspected during 1958–59 at Time of Railment or Transfer to Oil Expressors with Comparative 1957–58 Figures (in Tons)

Month	1958–59	1957–58
April	37,756	15,452
May	54,113	24,563
June	35,926	20,355
July	55,161	14,193
August	46,947	20,655
September	53,018	9,468
October	65,662	8,719
November	64,763	62,766
December	49,426	51,193
January	70,453	64,938
February	59,426	46,391
March	53,189	40,528
Total	645,730	379,221

Table 5.—1958–59 Crop Special Grade Groundnuts graded by the Produce Inspection Division from 7–11–58 to 31–3–59

Month	*In Tons*
November	75,670
December	161,975
January	149,475
February	74,140
March	39,516
Total	500,776

Table 6.—Transfers to Oil Mills 1958–59 (in Tons)

Month	1957–58 *Crop*	1958–59 *Crop*	*Total*
April	7,914	—	7,914
May	9,792	—	9,792
June	7,758	—	7,758
July	7,465	—	7,465
August	8,043	—	8,043
September	8,550	—	8,550
October	11,288	—	11,288
November	9,846	1,100	10,946
December	4,499	4,133	8,632
January	700	4,960	5,660
February	1,404	9,582	10,986
March	2	9,247	9,249
Total	77,261	29,022	106,283

Table 7.—Railment of French Groundnuts (in Tons)

Month	1956–57	1957–58	1958–59
April	3,424	831	6,356
May	7,021	3,953	9,809
June	6,303	411	3,267
July	6,373	2,791	9,098
August	6,357	4,928	2,434
September	4,063	2,742	4,165
October	488	394	352
November	345	101	535
December	6,790	9,371	9,797
January	5,515	7,141	12,137
February	8,923	6,162	4,815
March	9,058	7,309	150
Total	64,660	46,134	62,915

Table 8.—Staffing of Cotton Markets 1958–59 Season

Produce Inspection Area	*Staff of Native Authorities*		*Staff of Produce Inspection Division*	
	Cotton Supervisors	*Cotton Examiners*	*Produce Inspectors Grade II and below*	*Produce Examiners*
Funtua	7§	67‡	—	10
Maiduguri	1	15	—	—
Gombe	2*	—	—	76
Lokoja	1	25	4	—
Zaria	5§	89	—	—
Kano	1*	3†	—	25
Gusau	4§	61‡	—	—
Total	21	260	4	111

* Produce Inspectors acting as Cotton Supervisors in Gombe and Kano Area.
† Staff of the two markets (Nguru and Gashua) in Bornu Province.
‡ Assistant Cotton Examiners included.
§ Senior Cotton Supervisors included.

Table 9.—1958–59 Seed Cotton Purchases by Areas

Produce Inspection Area	*Grade I (lbs)*	*Grade II (lbs)*	*Grade III (lbs)*	*Total (lbs)*	*Tons*	*Cwt.*	*Qrs.*	*Lbs.*
Funtua	37,518,430	11,506,630	788,090	49,813,150	22,238	—	1	2
Gombe	29,876,830	6,146,766	3,948,421	39,972,017	17,844	13	—	1
Gusau	35,981,700	6,103,100	387,400	42,472,200	18,960	16	—	8
Kano	5,153,410	2,235,900	723,100	8,112,410	3,621	12	—	26
Lokoja	2,916,297	1,417,076	388,904	4,722,277	2,108	3	—	21
Maiduguri	3,757,500	1,264,700	294,500	5,316,700	2,373	10	2	4
Zaria	38,116,600	2,348,500	310,300	40,775,400	18,203	6	—	8
Total	153,320,767	31,022,672	6,840,715	191,184,154	85,350	1	1	14

Table 10.—Provincial Distribution of Seed Cotton Purchases for 1958–59 with Comparative Figures for 1957–58 (in Tons)

Province	1958-59 *Purchases*	1957-58 *Purchases*	*Increase*	*Decrease*	
Adamawa	2,928	2,758	170	—	
Bauchi	14,916	19,102	—	4,186	
Benue	951	1,058	—	107	
Bornu	2,606	3,197	—	591	
Ilorin	143	109	34	—	
Kano	3,389	4,064	—	675	
Katsina	22,238	33,596	—	11,358	
Niger	5,325	7,077	—	1,752	
Plateau	2,152	2,031	121	—	
Sokoto	19,131	33,724	—	14,593	
Zaria	11,570	13,530	—	1,960	
Total	85,349	120,246	325	35,222	Net decrease=34,897 tons

Table 11.—Seed Cotton Purchases for 1958–59 (in Grades) showing Percentages and Comparative Figures (in Tons)

Crop Year	*Grade I*	*Grade II*	*Grade III*	*Total Purchases*	*Percentage of Total Purchases*		
					Grade I	*Grade II*	*Grade III*
1955-56	55,926	14,817	6,592	77,335	72.4	19.1	8.5
1956-57	57,641	9,065	2,719	69,425	83	13	4
1957-58	93,955	19,526	6,765	120,245	78	16	6
1958-59	68,447	13,849	3,054	85,350	80.2	16.2	3.6

Table 12.—Downgradings 1958–59 (in Lbs)

Produce Inspection Area	*Grade I to*			*Grade II to*		*Grade III to No Grade*
	Grade II	*Grade III*	*No Grade*	*Grade III*	*No Grade*	
Funtua	87,081	2,180	—	2,178	—	—
Gombe	7,609	7,351	—	—	—	—
Gusau	6,314	1,387	355	900	—	—
Kano	28,032	—	—	2,381	—	—
Lokoja	—	—	—	—	—	—
Maiduguri	300	200	—	—	—	—
Zaria	10,180	1,773	65	—	—	—
1958-59 Totals	139,516	12,891	420	5,459	—	—
1957-58 Totals	157,074	12,851	2,531	2,170	—	—

1958-59 Total downgradings 158,286 lbs=70 tons 13 cwts 1 qr 2 lb.
1957-58 Total downgradings 174,626 lbs=77 tons 19 cwts 0 qr 18 lb.

Table 13.—Purchases of Benue Seed Cotton for 1958–59 with Comparative Figures for 1957–58 (in Tons)

Month	Purchases, 1957–58	Remarks	Purchases, 1958–59	Remarks
April	842	1956-57	561	
May	121	Season	—	
June	—		—	
July	—		—	
August	—		—	
September	—		—	
October	—		—	
November	—		—	
December	—		—	
January	285	1957-58	67	
February	547	Season	340	
March	1,668		1,132	
Totals	3,463		2,100	

Table 14.—Purchases of Palm Kernels for 1958–59 with Comparative Figures for 1957–58 (in Tons)

Month	1958–59 Purchases	1957–58 Purchases	Remarks
April	1,805	1,159	
May	2,508	1,899	
June	2,214	1,678	
July	1,933	1,360	
August	1,292	830	
September	987	678	
October	902	833	
November	891	925	
December	840	750	
January	848	809	
February	975	854	
March	1,264	1,295	
Total	16,459	13,070	

Table 15.—Purchases of Palm Oil for 1958–59 with Comparative Figures for 1957–58 (in Tons)

Month	1958–59			1957–58		
	Special Grade Palm Oil	*Technical Palm oil Grade I*	*Total*	*Special Grade Palm Oil*	*Technical Palm Oil Grade I*	*Total*
April	11	460	471	51	465	516
May	24	827	851	102	621	723
June	44	181	225	69	201	270
July	27	79	106	49	6	55
August	3	19	22	20	—	20
September	6	9	15	41	—	41
October	19	2	21	32	—	32
November	33	—	33	75	—	75
December	27	—	27	14	—	14
January	16	2	18	11	—	11
February	—	—	—	1	—	1
March	2	125	127	—	175	175
Total	212	1,704	1,916	465	1,468	1,933

Table 16.—Purchases of Cocoa for 1958–59 with Comparative figures for 1957–58 (in Tons)

Month	1958-59 *Crop*					1957-58 *Crop*				
	Main Crop Grade I	*Main Crop Grade II*	*Light Crop Grade I*	*Light Crop Grade II*	*Total*	*Main Crop Grade I*	*Main Crop Grade II*	*Light Crop Grade I*	*Light Crop Grade II*	*Total*
April	—	—	—	—	—	—	—	—	—	—
May	—	—	1	1	2	—	—	—	—	—
June	—	—	—	1	1	—	—	—	—	—
July	—	—	1	1	2	—	—	—	1	1
August	1	—	2	1	4	—	—	—	1	1
September	5	—	—	—	5	3	—	—	—	3
October	54	—	8	—	62	16	1	—	—	17
November	90	—	32	—	122	47	—	—	—	47
December	172	—	15	—	187	61	5	—	—	66
January	98	—	28	—	126	86	1	1	—	88
February	12	—	39	—	51	60	1	3	—	64
March	1	—	1	1	3	—	1	13	—	14
Total	433	—	127	5	563	273	9	17	2	301

Table 17.—Fumigation Statistics 1957–58 and 1958–59 Pest Control Unit

Year 1957-58	Commodities Fumigated (Tons)								
	Groundnut Tons Fumigated	*Lb Gas Used*	*Other Empty Bags*	*(Pieces) Tarps*	*(Tons) Grains*	*G/N Tons Cake*	*(Tons) Beans*	*Tons Sisal Kraft*	*(Tons) Miscellaneous*
April 1957	12,040	2,460	—	—	169	—	—	—	20
May	505	156	12,150	1,350	117	—	2	—	—
June	—	210	13,800	1,006	854	—	—	160	—
July	1,176	454	17,275	310	774	—	82	—	—
August	1,306	611	33,200	604	831	850	—	—	—
September	—	271	36,572	563	332	559	—	—	183
October	—	278	36,715	569	43	860	—	—	—
November	—	579	13,500	471	14	1,715	—	1	28
December	3	102	14,335	—	550	—	—	—	—
January 1958	1,617	413	15,748	—	7	320	—	—	—
February	668	200	5,500	102	—	500	—	—	—
March	2,513	648	2,566	—	—	716	—	—	—
Total	19,828	6,382	201,361	4,975	3,691	5,520	84	161	231
April 1958	13,414	2,687	2,300	—	—	—	—	—	—
May	17,642	4,120	29,950	538	76	—	—	—	—
June	1,151	254	21,975	1,754	—	80	—	—	20
July	—	34	13,900	1,460	17	—	—	—	—
August	3,187	836	28,400	616	20	795	—	—	—
September	960	311	25,600	706	94	21	252	—	—
October	6,722	1,413	47,025	521	8	121	52	—	—
November	2,648	549	25,600	563	—	—	—	1	—
December	—	101	34,825	815	350	120	—	—	—
January 1959	950	245	37,675	1,042	—	151	—	—	8
February	1,840	560	69,580	2,027	720	—	—	—	—
March	—	305	25,400	—	1,032	420	—	—	—
Total	48,478	11,415	362,230	10,042	2,317	1,708	304	1	28

Part III—Training and Education Division

THE SCHOOL OF AGRICULTURE, SAMARU

1. The school year commenced on 27th January, 1958 with an enrolment of 114 students, an increase of 36 over the previous year and one of the biggest in the school's history. Resignations and dismissals, none for bad conduct, reduced the number by 11 over the year. The nominal roll according to provinces as at 1st April is set out below:—

Province	1958 *A.A.S.*	1957 *A.A.*		1958 *A.A.*		*N.A. Junior*	*Total*
		Govt.	*N.A.*	*Govt.*	*N.A.*		
Adamawa	—	—	—	1	1	4	6
Bauchi	—	—	—	3	—	2	5
Benue	1	—	—	3	2	3	9
Bornu	—	—	—	2	—	4	6
Ilorin	—	2	1	5	1	—	9
Kabba	3	5	—	7	—	3	18
Kano	—	—	—	—	—	—	—
Katsina	—	1	—	6	—	—	7
Niger	—	8	1	5	—	3	17
Plateau	—	—	1	1	—	3	5
Sokoto	—	3	—	7	—	—	10
Zaria	—	—	—	2	—	4	6
Eastern Region	9	1	—	—	—	—	10
Western Region	3	2	—	—	—	—	5
Total	16	25		46		26	113

2. The nominal roll according to classes was:—

Course	*As at* 1-4-58		*Left*		*As at end of 3rd Term*	
	1957 *Entry*	1958 *Entry*	1957 *Entry*	1958 *Entry*	1957 *Entry*	1958 *Entry*
Assistant Agricultural Superintendent-in-Training	—	16	—	—	—	16
Agricultural Assistant, Secondary VI ...	2	5	—	2	2	2
Agricultural Assistant, Middle II-Secondary V	23	41	3	1	20	41
Native Authority Junior	—	26	—	4	—	22
Total	25	88	3	7	22	81

EXAMINATION RESULTS

Final examinations were held over the period 17th to 27th November. 15 out of 16 students on the A.A.S. course were successful with one student referred in certain papers, and 19 out of 22 students with one failure and one referred in certain papers in the final examination on the A.A. course. All the 22 students on the Junior Course N.A. were successful. Of the 41 students who sat their first year examinations on the A.A. course 40 were successful.

Details are given in the table set out below:—

Course	Presented		Passed		Failed	Referred
	1957 Entry	1958 Entry	1957 Entry	1958 Entry		
Assistant Agricultural Superintendent-in-Training	—	16	—	15	—	1
Agricultural Assistant, Secondary VI ...	2	5	2	5	—	—
Agricultural Assistant, Middle II—Secondary V	20	38	19	37	1	1
Native Authority Junior	—	22	—	22	—	—
Total	22	81	21	79	1	2

SPEECH DAY AND PRIZE GIVING

Certificates and prizes were presented to successful candidates in the Final Examination by the Minister of Agriculture the Honourable Alhaji Mohammed Mustafa, M.H.A., at the Speech Day ceremony on 6th December, 1958. Seven Ministers with their Parliamentary Secretaries, a representative of the Emir and many other distinguished guests were present.

STAFF

Mr D. Westwood took over as Principal from Mr Kingshotte on 30th January, 1959. The senior staff position as at 31st March, 1959 was as follows:—

Mr D. Westwood	... ...	Principal
Mr G. B. Norrie	... ...	Agricultural Officer
Mr S. A. Cramer	... ...	Lecturer
Mr B. H. Delf	... ...	Agricultural Superintendent
M. Abdulkadiri	... ...	Assistant Agricultural Superintendent
Mr M. O. Pearce	... ...	Executive Officer

The Junior staff position at 31st March was:—

Assistant Agricultural Superintendent	4
Assistant Agricultural Superintendent-in-Training	3
Agricultural Assistants, Grades II and III	4

IMPORTANT EVENTS DURING THE YEAR

1. *Visitors.*—During the year the Hon. Premier of the Northern Region visited the school and several Honourable Ministers. In addition there were many visits from District Heads and Native Authority representatives and staff and students from Nigerian educational establishments. Overseas visitors included Professor R. Wain of London University, Mr F. de Geus of F.A.O. and Dr J. Dreir of the United States Department of Agriculture.

2. *Student Excursions.*—At the conclusion of the final examinations, students accompanied by members of staff were again sent on long tours visiting agricultural projects and places of interest. The A.A.S. class went to the Western Region, the Second year A.A. Class to the Plateau and the Junior N.A. class to Katsina and Kano Provinces.

3. *Visiting Lecturers.*—Much help was given in the form of lectures, demonstrations, etc., on their specialised work by members of the Regional Research Station and Land Use Branch Staff. The Conservator of Forests, Zaria, the Provincial Veterinary Officer, Zaria, and the Assistant Registrar of Co-operatives also very kindly visited the school to lecture to the students.

A.A.S. CLASS PROJECTS

Members of the A.A.S. class were again each given projects to work on either individually or in groups of two, and on which they had to submit a report at the end of the course.

Two typical projects were:

(*a*) Poultry feeding trial—Penicillin supplement versus no Penicillin.

(*b*) Collection and preservation of disease and insect-attacked plants and plants poisonous to grazing animals.

The results were generally satisfactory and projects now form an important part of the A.A.S. curriculum.

EXTRA CURRICULAR ACTIVITIES

1. The Students Union was again the medium through which most of the extra curricular activities were arranged, student committees being normally responsible for organisation, advised where necessary by members of staff. The Friday Night Club arranged a programme of films, lectures, social evenings including inter-school debates. Football continued to be the most popular sport and a number of friendly games, home and away, were played with neighbouring institutions. In the Inter-House series the cup was won by Baker House. Hockey was also played.

The first Inter-House athletics meeting was organised in late 1958. It was very successful and should now become an annual event. Baker House scored the most points.

2. Students were provided with small gardens of their own to cultivate and seeds were distributed to them. The results were encouraging and a prize was given to the student with the best garden, judging taking place September, 1958. An Agricultural Show was organised by the students with classes for crops grown in their gardens and for collections of wild plants, etc. Entry fees were charged and prizes awarded. The show which is an annual event was very successful and is particularly useful in that it gives students experience in organising an Agricultural Show and also in staging exhibits. Competitions in practical agriculture, e.g., ploughing, budding and grafting, tractor maintainance and so on were again organised on an Inter-House basis and proved to be very interesting. The competitions although regarded as an extra curricular activity give the staff a good deal of help and guidance in planning and teaching practical work.

SCHOOL FARMS

1 The school farms were again used for students' practical work, for demonstrating practical farming and new techniques and also for demonstrating experimentation.

2. There are three school farms viz:

(*a*) Two training farms on which most of the work is done by students using hand and bullock labour only.

(*b*) Main farm on which most of the cultivation is done by tractor and on which a dairy herd is maintained.

Students do some work on the main farm and are taught milking and feeding of livestock, etc., but the farm is also used for demonstration purposes and much of the work is done by paid staff.

During their training, students work according to a rotational system on all the farms and also on the school gradens, orchards and irrigation area. The school maintains a herd of dairy and working cattle also pigs, poultry and goats. All have done well except the poultry where there were set-backs due to faulty incubation. The school poultry section is now developing in addition to imported Rhode Island Reds, two strains of improved Nigeria fowls. The dairy herd is worthy of special mention as the average yield of the herd is now 304 lb. per head covering 14 lactations, and the cows are now calving at fairly regular intervals some 11 to 14 months after the previous parturition Heifers calve at three to three and half years.

BUILDINGS

The Ministry of Works carried out repairs during the year to buildings in the hostel area and considerably improved the amenities. On the main farm the old implement shed, wrecked in a storm the previous year, was replaced and the workshop block was completed making a welcome addition to the farm steading.

ACADEMIC YEAR, 1959

1. In January 1959 a new intake of students was enrolled plus of course the students on the 1958 Agricultural Assistant course returning for their second year.

2. One remarkable change in the Agricultural Assistant intake should be recorded. Due to the rising standard of education in the Region 18 students had sat the West African School Certificate compared with only five the previous year.

3. This has resulted in a raising of the standard generally and the sub-standard entry of secondary II almost completely disappeared.

4. Ten students with meritorious service as Agricultural Instructors in the Ministry also entered the course.

5. The total student roll at the beginning of the year was 122, an increase of 7 over the previous year.

Details are set out in the tables below:—

Course	1958 Entry	1959 Entry	Total
Assistant Agricultural Superintendent-in-training	—	16	16
Agricultural Assistants, Secondary VI ...	5	19	24
Agricultural Assistants, Middle II ... Secondary V	37	20	57
Native Authority Junior	—	24	24
Total	42	79	121

Province	1959 A.A.S.	1958 A.A.		1959 A.A.		N.A. Junior	Total
		Govt.	N.A.	Govt.	N.A.		
Adamawa	—	1	1	2	—	2	6
Bauchi	—	3	—	—	—	3	6
Benue	1	4	2	—	—	3	10
Bornu	1	2	—	2	—	3	8
Ilorin	1	4	1	5	—	1	12
Kabba	2	6	—	3	—	2	13
Kano	—	—	—	1	—	3	4
Katsina	—	5	—	3	—	2	10
Niger	—	5	—	8	1	1	15
Plateau	1	1	—	4	—	1	7
Sokoto	2	5	—	4	—	3	14
Zaria	—	2	—	1	—	—	3
Eastern Region	6	—	—	2	—	—	8
Western Region	2	—	—	3	—	—	5
	16	42		39		24	121

TRAINING AND EDUCATION DIVISION: OTHER ACTIVITIES

Kabba School

1. During the year two staff houses on the Kabba school site were completed by the Ministry of Works and an Agricultural Superintendent posted to Kabba to take over the land from the previous occupiers and to begin soil conservation work and the laying out of the farms.

2. He occupied one of the houses and the other house, initially intended for an Inspector of Works to supervise the building of the school, was occupied by a member of the staff of the Ministry of Works. The land was surveyed, the intended farm roads were traced, bunds marked out and in some cases constructed, and planting material collected, so that by June 1959 a limited cropping programme can be commenced. By the end of the financial year part of the compensation had been paid to the previous occupiers but there was a balance remaining to be paid in the year 1959-1960.

Short Courses for Agricultural Instructors

1. A short course for Agricultural Instructors employed in the Regional Research Station, Samaru was held at the School of Agriculture from 12th January to 7th February 1959. The course included field and classroom work and 22 students attended. Mr Uyanwune, Assistant Agricultural Superintendent, was in charge of the course but instruction was also given by members of the school and Regional Research Station staffs.

2. A similar course was given to 20 Agricultural Instructors and Agricultural Instructors-on-Trial from Katsina and Sokoto Provinces at the Ministry of Agriculture Farm, Daudawa, from 23rd March to 25th April. The syllabus for this course was especially adapted for men employed in provincial agricultural work.

3. Arrangements were made early in 1959 with the Ministry of Land and Survey for a short course in surveying for employees in the Irrigation, Field Services and Research and Specialist Services divisions of the Ministry.

4. The course to last six months began at the Survey School of the Ministry of Lands and Survey on 9th February, 1959. Minimum qualification for entry was Middle II, with something better preferred. All the instruction was given by members of the staff of the Ministry of Land and Survey and this Ministry is very grateful for the help given. Twelve students attended the course.

Clerical Training

1. Although the course is not due to begin until April 1959, arrangements were made during the current year with the Institute of Administration for a special training course for 21 members of the clerical staff of this Ministry.

2. The instructor who will be in charge of the course visited offices of this Ministry between January and March 1959 to familiarise himself with the work and to draw up a satisfactory syllabus of instruction.

Other Activities

1. Staff of the School of Agriculture at Samaru gave Courses or individual lectures to Assistant District Officers-in-Training at the Institute of Administration, to the Boys Company, the Nigeria Regiment and to students at Co-operative Training Classes.

2. As in the previous year the Secretary, Training and Education, acted as Liaison Officer with the Ministry of Education and on behalf of the Ministry of Agriculture attended certain meetings of the Regional Scholarship Board.

3. He also attended committee meetings of the Association of Young Farmers Clubs in Northern Nigeria and in November 1958 he attended an Inter-Regional Conference of Schools of Agriculture held at Ibadan.

Part IV—Irrigation Division

GENERAL

1. The formation of the Irrigation Division in 1948 with the acquisition of two engineers and the development over the next ten years followed the general pattern for the development of new irrigation and drainage organisations elswhere even if the initial period extended over a longer period than is generally expected. This may be generally attributed to the vast distance and areas found in the Northern Region and to the very difficult staffing problems which arose in a profession generally short of experienced irrigation engineers.

2. During this initial period engineers were posted to the provinces with the general objective of trying to find small irrigation schemes and get construction under way. Very little control was exercised from headquarters or indeed was possible due mainly to the fact that there were no trained staff available to effect the necessary liaison with headquarters and secure adequate recording of data both in the provinces and in headquarters. It became obvious too that this fundamental approach to irrigation in the Northern Region was not going to produce the necessary results.

3. The first lesson learnt during these formative years was that a strong and experienced headquarters organisation was a first essential in order to provide initially the proper direction of effort in the provinces and ensure the continuity of that effort despite staff changes occasioned by senior officers going on leave and leaving the service. It was felt essential that this could only be provided by the posting of the Deputy Secretary, Irrigation to Kaduna in order that contact with the provinces was not lost during the Secretary's absence on tour. Such an arrangement would also ensure that adequate touring would be possible without disrupting the direction of the overall activities of the division. Adequate touring thus made possible would ensure that the experience of the headquarters staff was available to all provinces which inevitably must be staffed by inexperienced engineers.

4. The second and perhaps the most important lesson which was learnt was that unless complete hydrological coverage was established over the river systems of the Northern Region, no irrigation scheme could be designed with the confidence that the best use was being made of the very inadequate water supplies in the natural courses and with the assurance that the scheme was going to be successful and not destroyed by future floods and droughts.

5. It was therefore considered essential to recommend to government the formation of a Hydrological Section charged with the duty of establishing hydrological coverage over the Northern Region as quickly as the training of staff would permit. This Hydrological Section would be in charge of an experienced officer stationed at headquarters from where he could control and guide the officers in the provinces. The headquarters would become the

collecting and processing centre for all the data sent in from the provinces and provide a sure basis for the design of any future schemes.

6. The third lesson provided by those formative years was the necessity to provide planned objectives to which all the energies of the division could be continuously directed. These planned objectives should take into account the future utilisation of the total available water resources of the region together with the available land on which these resources might be utilised.

7. In view of the very limited topographical data available it was not possible to define a long termed programme except in the very widest terms and it was necessary to let the detailed shape of that programme developed gradually as the knowledge of the irrigation engineers was widened and developed by touring their respective provinces.

8. By these means the programme of work was modified throughout the year to meet unexpected difficulties as they were encountered and by the end of the year the programme of investigation and survey began to assume a definite shape.

9. Some degree of centralised control had also been imposed by the end of the year but many difficulties remained at the year's end before it could be claimed that the division was operating with a reasonable degree of efficiency and pursuing a defined programme of investigation, the ultimate objective of which, would ensure the most economical utilisation of the surface water resources of the Northern Region.

10. A further and important measure which would ensure the quicker establishment of the division on a firm basis was the formation of the Technical Hydrological Committee for all Nigeria of which the Irrigation Division become an active member. Membership of the International Congress on Drainage and Irrigation was also acquired.

Membership of both these bodies was intended to establish a reputation for the division both in Nigeria and internationally. Membership of these bodies, besides providing valuable data on modern techniques, ensures that Nigeria will in future become known in the international field of drainage and irrigation and will find support for applications for international funds and will improve the prospects of recruiting senior staff.

11. The pattern of the long term programme was influenced by many factors, but, probably the most important single item, was the deliberations on the Jebba Dam project. No attempt has ever been made to harness the vast supplies of water in the Niger, owing to the enormous difficulties involved. The prospect of a multipurpose dam on the Niger alters the situation radically, and investigations in Niger and Ilorin provinces were reduced to a minimum until the situation in regard to the building or otherwise of one of the dams clarified itself.

12. This decision was reinforced by the fact that little success had rewarded the efforts of the division in the dry north and concentration of effort in that area was justified on the grounds of pressure of population and the very inadequate rainfall of that region.

13. In the Bida area where two schemes have been in operation for several years the rate of development has slowed down somewhat and they are still not fully cultivated. Further the greatest difficulty towards the fullest utilisation of the irrigation supplies is the conservativeness of the farmer who still refuses to plant his crop of rice as soon as the irrigation supply is available and prefers to wait until the rains have finally started. He also clings to his own outdated methods of husbandry despite the fact that modern methods are practised in the adjoining research station.

14. Experience in these areas emphasises the need for the training of local officers in the modern methods of cultivation of irrigated areas and establishing them in these areas with the objective of weaning the farmer on to modern methods of cultivation. Even so it will take many years before full utilisation of the benefits of irrigation is achieved.

OFFICE AND ADMINISTRATION

1. The year started with only five officers, including the Secretary occupying duty posts and five others on leave. The staff shortage at that time enabled only the construction work in Bida and Sokoto to be continued and virtually all other work was shut down. During August and September three of these officers on leave returned to duty and recruitment provided four more permitting the over all plan of investigation to commence. For the remainder of the year the staff position although not fully satisfactory enabled three quarters of the established posts to be filled.

2. In September nine recruits, five inservice Irrigation Surveyors, and four direct recruits, entered the Technical Institute, Kaduna for the first nine months training course for Assistant Technical Officers-in-Training. In July four Assistant Technical Officers finished the second nine months at the institute and passed their final examination. The position with regard to senior technical staff thus started to improve permitting the programme of work to be implemented.

3. A promotion examination was held for Irrigation Overseers to Irrigation Surveyors was held during the year but the results of the examination were not available at the end of the year. The Survey department also started a course in practical training for Irrigation Overseers within the division. This course lasted six months and after training the officers were returned to their stations. It is hoped that further courses of this nature will be held but at the end of the year the matter was still under consideration. Officers taking this course are those who have been taken on at daily paid rates and their suitability judged before being recommended to attend the course.

4. Generally speaking the pattern of training has been established and if retained continously would provide a steady flow of suitably trained officers to fill the vacancies in the establishment. Unfortunately owing to staff shortage in the organisations providing the training the programme has been interrupted.

5. An offer from the Inland Waterways Department based on Lokoja to accept officers, both junior and senior, for training in the use of the hydrological instruments operated by that department could not unfortunately be accepted owing to the staff shortages. It is hoped later in the next financial year to take advantage of this very generous offer.

6. Further developments of the division were provided for by the insertion in the draft estimates of three further posts of Irrigation Engineer and four posts of Assistant Technical Officer-in-Training. Provided these posts can be filled fairly rapidly and those at present in service retained the development of the programme of work proposed should be fairly satisfactorily.

7. The offices at Bida, Pategi, Sokoto, and Kano were retained and their organisation remained virtually unchanged. In Maiduguri however where two officers were posted in September the cramped accommodation at the farm was no longer adequate and the use of the old B.O.A.C. building at the airport was obtained, and a staff was built up to undertake the very greatly enlarged programme of work. In Plateau Province the continual demand for the posting of an irrigation engineer was acceeded to by posting an experienced engineer to investigate the feasibility of carrying out any irrigation schemes in that province. It must be appreciated that as this area provides the headwaters of the rivers of the Northern Region any scheme that should be found feasible will of necessity be very small.

8. In Sokoto Province the detail and scope of the investigations soon became clear and it was appreciated that if these investigations were to be carried out within reasonable time further office accommodation was essential. It was therefore proposed to government that approval should be sought for the building of a new office. Approval had been obtained by the end of the year.

9. An attempt was made towards the end of the year to introduce uniformity into the production of drawings, and estimates, and records did not make much progress owing to junior staff shortages. It is hope that more progress will be made in the coming year with more staff becoming available.

ACTIVITIES IN THE PROVINCES

Niger Province

1. The Tungun Kawo drainage and irrigation scheme, situated between Tungun Kawo and Bakoji in the Wushishi Emirate, is an inland fadama of very fertile land and it is proposed to provide drainage and flood protection to about 2,000 acres. An irrigation supply is also to be provided. Last year about 180 acres were mechanically ploughed and produced excellent yields of rice; there was no flooding during the season and the crops were not damaged.

During the current year a complete survey of the area was finished and plotted. The drainage control structure was almost completed and the irrigation headworks about sixty per cent completed. The two Priestman

dragline excavators started work on the drainage channels and completed about 4,000 feet. The original estimate of £27,000 was based on unrealistic excavator working costs and had to be revised to the present figure of £34,500 and approval of the Ministry has been sought for the new figure.

2. The Guzan irrigation scheme is situated on the left bank fadama of the Niger near the village of that name in Kutigi District. The objective was to provide irrigation for rice cultivation on about 1,500 acres of land above the flood level of the river, by constructing a diversion weir and control gate on a perennial stream called the Yiko. A distribution system was also to be provided.

3. A preliminary large grid survey showed the area to be suitable but when a more detailed grid survey was added it revealed that the area was intersected with deep old river channels which would be difficult and expensive to cross with distribution canals and the suitable area was thus reduce to only 500 acres. The cost of construction of a scheme to provide irrigation for only 500 acres would prove uneconomic and a reconnaissance was made of the area adjoining the right bank of the Yiko stream with a view to increasing the irrigable area to an economic figure. The available water supply in the Yiko stream is sufficient to justify this further investigation.

4. The Bakoji scheme is situated on a fadama on the left bank confluence of the Gbako and the Niger running parallel to the Minna-Baro railway.

The fadama is nine miles long and varies in width from two to one half miles, part of which is already cultivated by local farmers for rice growing using water from the Emoko stream which crosses the area at a point approximately half way along its length. the original objective was to provide irrigation to the area already under cultivation and improve its drainage. It was also intended to extend the area served with irrigation facilities and provide drainage. It was intended to use the Gboko river as the source of supply supplimented by the Emoko stream.

5. This proved to be a very large scheme and would absorb an undue proportion of money and resources of skilled labour, materials and equipment. It was decided therefore to investigate the possibilities of a series of smaller schemes using the small streams that cross the area. It was intended to exclude the area already irrigated from Emoko stream and three other smaller schemes near Katcha. This consisted of about 2,500 acres of land under rice cultivation with a very good native system of irrigation, leaving about 6,000 acres requiring an irrigation supply.

6. A draft scheme and estimate were forwarded to the Principal Agricultural Officer for his comments and views. An interim reply had been received by the end of the year and a final report is awaited.

7. The Wuya-Edozhigi scheme is situated on the left bank of the Kaduna river south of the Wuya Ferry and west of Edozhigi village. The scheme is complete except for essential modifications which operation of the system has shown to be necessary. A flood protection bund five miles long and

averaging 10 feet in height excludes the Kaduna floods from an area 3,000 acres and an irrigation supply is provided by diversion weirs on the Kupanko and Ejiko streams and a distribution system.

8. Essential modifications which have been carried out during the year are that provision of a new field channel from K. 3. and the construction of a flood protection bank 2,000 feet long to prevent overspill from the Kupanko Diversion Channel on to the Bida Mokwa Trunk Road and regrading of the last 4,000 feet of the diversion channel, which was badly damaged during the 1957 floods. Work was started on raising the flood protection bund to a height sufficient to cope with maximum floods similar to those experienced in 1957. This work is continuing and will be completed in 1960.

9. The Badeggi irrigation scheme is situated on the right bank of the Gbako river near Badeggi and consists of an area of 2,500 acres of fadama provided with an irrigation supply from the Musa river, a tributary of the Gbako, by means of a diversion weir, a distribution system, and a drainage system. The scheme is completed except for minor alterations which were carried out during the year.

10. It was found that the semi circular weir built across the front of the intake gate induced the deposition of silt, rather than excluded it, in the main canal. It was removed and a silt excluder of the platform type was built opposite vent No. I of the main barrage. This seems to have solved the problem at the moment although it is too early to say if it provides the final answer.

11. Both the Wuya-Edozhigi scheme and the Badeggi scheme have been handed over to the Native Authorities for development under control of the Irrigation Management Committee. With the assistance of the Irrigation Engineer the scheme is operated and maintained by that committee and a water rate of £1 per acre per annum is charged to provide the funds to do this work.

12. The Loguma irrigation scheme is situated on the left bank of the Niger alongside the Minna-Baro Railway at Loguma, three miles east of Katcha. An irrigation supply is provided by a diversion weir on the Emi stream above the railway culvert and the road. A main canal three quarters of a mile long and a distribution system feed the area. The scheme was completed during the year and handed over to the Native Authority for maintenance, operation and development. The area is not as yet declared as a settlement area although steps to that end have been taken. A few minor improvements have been undertaken towards the end of the year.

13. A considerable number of reconnaissances and some survey work has been carried out in the Lapai and Agaie Emirates but the results have not been very promising. A possible scheme at Shegba, about nine miles north of Wuya ferry, was investigated. About four square miles of fadama could be suitably irrigated by a good perennial stream close by but it was found that it suffered from heavy flooding from the Kaduna river and had to be abandoned.

Ilorin Province

14. The Duku irrigation scheme is situated at Lade six miles from the town of Pategi and consists of an area of 1,500 acres fed by headworks on the Duku stream. A main canal from the headworks running along the contour passes the irrigation supply to two distribution canals and thence into field channels.

15. Owing to lack of engineers the work on the scheme was closed down with the departure of the Irrigation Engineer on leave in April, 1958 and was not re-opened until June when another engineer became available. Until October work was confined to surveying and the maintenance of the main canal. In October, the work on the headworks was restarted and completed before the end of the year. By the end of the year work was in hand on the cross drainage structures and the drops in distributary A. The earth works in the distribution system were undertaken under contract.

16. Daily guage reading and some discharge measurements were taken throughout the year on a number of small streams in the Pategi area in connection with future possible schemes. This work is in no way integrated with the hydrological coverage of the Niger undertaken by Messers NEDECO on behalf of the Federal Government, but it is considered of considerable importance to continue the collection of that data as it will eventually be of considerable value to any schemes that arises out of the Jebba dam project.

17. The question of ulitisation of the waters of the Niger has never figured in the proposals of the Irrigation Division owing to the high cost of using water from this source. With consideration being given to the possibility of construction of a dam at Kurwasa the possibility of using the fadama for irrigation purposes has now been mooted. The Irrigation Division through lack of staff cannot possible undertake such an investigation and the preliminary work is being done by the consultants in close co-operation with them.

18. In the meantime there has been a general run down of investigation work in the Niger valley pending a crystalisation of the situation caused by the Kurwasa project.

Sokoto Province

19. The construction work in the province centred round the Wurno irrigation scheme where an attempt was being made to finish the flood protection bund before the advent of the rains made work inside the bund impossible. The Caterpillar D. 6 and scraper worked satisfactorily at this job up until the close of the year and a D. 4 tractor and scraper fitted with a reconditioned engine joined in the work as soon as it was ready.

It became obvious towards the end of the year that unless additional heavy earth moving equipment could be acquired the work could not be finished in time, and approaches were being made to holders of heavy earth moving equipment with a view to hiring suitable units.

20. Internally the main drain was completed and construction of the distribution system including the Lugu canal was well under way. All structures were complete and distributaries Nos. 3, 4, 5, 7 and 8 together with their field channels were completed. Work on the Tutudawa canal regulator was started and was ready for placing the foundations by the end of the year.

21. It was not intended to do any work on the distribution system for the Tutudawa canal until experience had been gained from the operation of the Lugu canal during the next two seasons.

22. In consultation with the Field Services it was decided to experiment with the growing of white rice during the coming wet season and it was decided to issue free rice to selected farmers and keep a check on the progress of this planting.

23. Early in the year an engineer was transferred to Birnin Kebbi to survey the experimental plots on behalf of the Field Services. When this work was completed the engineer was transferred back to Sokoto and undertook a survey of the dry weather extension to the Kwarre irrigation scheme with a view to designing a scheme for the utilisation of the dry weather flow which is of considerable proportions. Plotting was completed and an estimate was in the process of being prepared by the end of the year.

24. An accurate survey of Bukwium and Gummi was undertaken with a view to estimating how these schemes could be put into effective operation and prepare an estimate to ascertain the cost of these alterations. It is now realised that these schemes in themselves can never be an economic proposition either from the point of view of capital cost or of annual running costs. It is felt however that if they can be made to function satisfactorily they would serve as development projects which would form the basis for other large and more economic schemes in the same valley. On this basis the modification and repair of both these schemes might be justified.

25. The general lack of hydrological data in the Sokoto catchment has proved a very serious drawback to the design of any major scheme. In that area efforts have been made during the year to extend the coverage of hydrological stations in the catchment. Gauge sticks were installed between Argungu and Bunza before the rainy season set in and these were extended in February to the Bunza-Yelwa section of the river. Current meter readings were at Sokoto on the Rima and Sokoto rivers. Further readings were not possible owing to lack of instruments and trained staff. Silting sections were established at Zurmi, Kaura Namoda, Wonaka, Wamako, and Gusau with the objective of accurately culculating the changes taking place in the river regimes.

26. Observation of the rivers in the Sokoto catchment during the period immediately before the rains and during the wet weather indicated that these rivers have unusual characteristics and may prove extremely difficult to investigate. It is thought that all the usual methods of hydrological data collection will need drastic modification of techniques to enable reliable information to be collected.

Plateau Province

27. Considerable pressure has for sometime been exerted on the Ministry to investigate the possibilities of providing irrigation facilities to suitable areas on the high plateau. There was no intention of opening up an office in the plateau area until sufficient prospects of suitable areas had been proved. The Irrigation Engineer, posted to Bukuru in January, was therefore not provided with any staff or an office, such facilities as he required for his work being provided by the Principal Agricultural Officer, Jos.

28. The activities of the Irrigation Engineer were considerably curtailed from March onwards by election duties but by the end of the year a considerable amount of information had been collected detailing the problems faced by the intention to provide irrigation on the plateau.

29. The main cause for the demand for irrigation arises from the high density of population on the plateau allied with the overcultivation of the soils. Since the plateau provides the sources of the Northern Region river system an extreme lack of water supplies in the natural courses was to be expected and it was found that there was no desire among the population for irrigation facilities but this was generally attributed to ignorance of the benefits that would derive from such facilities.

30. It was quickly realised that the best soils were located on the basalt flows and the activities of the Irrigation Engineer were confined to these areas. One area which seems to provide the best prospects for a successful scheme was located at Ta Hoss. Further investigations to be resumed after completion of electorial duties.

Kano Province

31. The problem faced by an irrigation engineer searching for possible irrigation schemes in Kano Province is to find suitable areas of land adjacent to an adequate source of water supply, to enable a scheme to be prepared at an economic cost per acre, both for construction and for annually recurrent maintenance and operation costs.

This search has up until now proved almost fruitless and the schemes that have emerged as possible subjects for attention in detail have in almost all cases run into difficulties over other aspects of land tenure and cultivation.

32. The decision therefore has been taken to the effect that the establishment of hydrological coverage of the Hadejia river and its tributaries should receive priority in Kano Province. This work cannot be undertaken until staff trained in the use of hydrological instruments can be provided, by the Sokoto office.

33. Meanwhile the search for possible areas was continued. The general reconnaissance of the Hadejia valley revealed that very little in the way of suitable ground for irrigation exists above Wudil. Above this point the hydraulic gradient is very steep causing the river to have a flashy regime and enabling it to carry a very heavy silt load which would cause insuperable difficulties if used as a source of irrigation supplies.

34. From Wudil to Ringin the channel is still well defined and has a good hydraulic gradient; there are however several fadamas on this section which gave promise of some possibility of being suitable for irrigation purposes. Fadamas 'TO' and Lebun were investigated but operations were suspended after investigation by the administration who advised that the area was already integrated with the local economy and could not be converted into irrigation schemes without interferring with that integration. Fadama Ruma was in the process of being investigated.

35. Between Ringin and Hadejia the river channel splits up into numerous small channels which are inadequate to retain the floods of the wet season and severe flooding and silt deposition appear to be general.

Unlike other provincial centres of irrigation and with the exception of the definition of the broad hydrological proposals, the broad definition of the long termed objectives has yet to be laid down, and until this can be done it is not possible to direct the present and future energies of the division on a well defined plan. Kano Province does in point of fact present the greatest difficulties.

36. Success has also evaded the two small schemes completed in Kano Province during the previous year. The Tomas scheme was not cultivated by the local farmers because of conflicting land tenure problems which were still awaiting solution at the end of the year. The Makoda Lake windmill scheme also proved difficult, the pump could not be made to operate satisfactorily despite the provision of new washers on the pump. Widespread damage was done to the canals by uncontrolled wanderings of cattle and goats. As there was no protection to the irrigation fields from these animals no crops were planted.

37. During the year the Senior Irrigation Engineer visited many cattle dams on behalf of the Native Authority and gave advice on repairs to spillways and bunds. Sites of new dams were also visited and survey and the Native Authority advised on the method of construction.

Bornu Province

38. The Irrigation Division office which was put in charge of the Principal Agricultural Officer when the irrigation engineer went on leave, was reopened when that officer returned to duty in August. Shortly after a new officer of long experience in Malaya was posted to Maiduguri at the specific request of the Minister.

39. The prospects for irrigation in Bornu Province were quite clearly definable. If there was to be any large scale development based on irrigation any proposals which would have a significient effect on the northern economy must be based on the utilisation of the water of Lake Chad. There is only one way in which these waters could be used and that is by pumping and because of the high cost of providing such an irrigation supply the areas, in the immediate future, that could be so irrigated must of necessity be within a few miles of the shores of that lake.

40. Very little factual data was available on which to develope such a proposal and it was inevitable that the first attempt would be a shot in the dark. As the centres of dense population were situated around Mongonu and Marte the latter area was chosen for an initial feasibility investigation. Before any detailed survey work could be undertaken it was necessary to prove the feasibility of pumping Lake Chad water on to the adjoining firki soils irrespective of the other considerations that a detailed survey would require. Some scanty evidence of suitability of the Lake Chad water and of the soils were available and on this basis the feasibility survey was undertaken.

41. It was noted that further eastwards of the Marte area selected for inspection that the soils gradually changed from true firki to lighter and more permeable soils and should it be found that the firki soils raised difficulties over drainage it was provided that the survey should be extended into the lighter soils. It soon became evident that the belt of sand lying between the lake and the firki soils would prove a very expensive item in bringing the water from the lake to the area designated. Despite this fact it was proved that it would be physically possible to irrigate the selected area before the end of the year and a detailed survey was put in hand.

42. It was also found that the narrow strip of land bordering the Yobe river was very fertile and that considerable areas close to the river had been irrigated by shaduf for many many years. It was therefore proposed to investigate the possibility of providing pumped irrigation to the existing areas and extending the total area to some 500 acres at three specific points between the villages of Daya and Yo. Owing to staff shortages this work should not start until there was an engineer available but arrangements were made to send one of the staff home early and post him, on his return, to Yo, to undertake this investigation. The problems of soils suitablility and water analysis does not arise in this case since the source of the supply has already been proved and the soils are suitable because crops for local consumption and for export have been grown on these soils for many years.

43. The need for the establishment of hydrological coverage of the rivers in Bornu and the lake are appreciated. In view of the priority of the investigations in Sokoto and the complete lack of trained subordinate staff the establishment of that coverage could not be undertaken for some years.

44. It was decided however that as many stick gauges as possible should be installed as soon as conditions permitted.

45. The original irrigation office was situated at the farm outside Maiduguri, and with the posting of a second engineer, proved to be totally inadequate. A search for more suitable accommodation finally resulted in the occupation of the old British Overseas Airways Corporation building at the airport.

Part V—Research and Specialist Services Division

GENERAL REVIEW OF THE YEAR

1. The research report of this Division is being published separately as Part II: "Results of Investigations" of this report and details of the work outlined below will be found therein.

2. The year has been one in which the staff position and certain facilities have again been improved. There has been a great increase in the number of visitors to the Station and besides the usual cropping schemes conferences, a highly successful conference of Principal Agricultural Officers and Agricultural Officers was held at Samaru in September. Among the distinguished visitors to the station were the Premier of the Region and the Minister of Agriculture.

3. Officers of this Division were able to visit every province in the Region and inspected provincial experiments, collected specimens of plants, pests and diseases, studied local problems or conducted surveys of crops or soils.

Buildings

Fourteen senior staff quarters were completed at Samaru. Construction of permanent labour lines has continued and to date 40 family units have been finished. Work began on the farm centre on the extension. Tractor sheds, cattle pens and stores have been started.

Staff

1. During the year staff was increased by two entomologists, one botanist, one Finance/Staff officer and two soil survey officers.

2. The departure of Messrs Butler and Irving on retirement represents a loss which has made itself felt throughout the Division.

3. The junior staff position continues to be inadequate: there are still far too few suitably qualified Northerners to fill the existing vacancies.

Work of the Division

1. With the increased number of staff and some improvement in facilities, there has been considerable progress in the building up of the research organisation and there are good indications that the lines of investigation being followed are producing results. The chief drawback is still the lack of adequate buildings to house officers and laboratories.

BOTANY SECTION

1. The Botany Section is divided into sub-sections: cereals, food crops, groundnuts, general crops, tree crops and pathology.

2. Work on cash crops has been going on for many years whereas intensive work on food crops is of more recent origin. The emphasis has been placed on obtaining the maximum amount of information on local crops by means of detailed surveys at the divisional level. At the same time

collection of seed samples from the surveyed areas has been going on. The amount of information collected has been immense and work is progressing in analysing this valuable information.

Sorghum (*Sorghum vulgare*)

1. The main objective has been to determine which local varieties or types are of major economic importance, in that potentially they will perform well over large areas. Since previous work has indicated that the behaviour of varieties in different ecological zones is complicated, it would be dangerous to use "yield of grain" as the sole criterion of adaptability. Therefore part of the programme includes a genecological approach to the problem.

2. Assay plots containing a standard set of six local varieties were grown at five stations in different ecological zones. These supplemented the 33 provincial yield trials. At Samaru work continued on the sample survey and in the uniform nursery; the latter includes observations on new introductions.

3. An analysis of the genotypic differences and phenotypic responses of these collections is being made by growing them at Samaru and in the provinces and comparing the data obtained with the original samples and records obtained from the countries of origin.

4. At Samaru the best Farafara strain showed a 40 per cent increase in yield over the controls. The breeding programme also included the varieties Tall Kaura and Short Kaura. Seed of some Short Kaura strains was sent to Harwell where it was irradiated with Co^{60} in an attempt to produce mutations for height and maturation period. Selections from hybrid material (Nigerian local x U.S. combined varieties) were again grown in progeny rows.

5. The performance of local varieties in provincial yield trials has not been consistent with ecological zone boundaries. In the Southern Guinea Savanna zone the stations were divided into those where Mokwa Local appeared promising and those where Farafara from Samaru confirmed previous results. Similarly in the sub-Sudan zone some stations were suited to Yar Gunki, from the Sudan zone, whereas others seemed equally suitable for Farafara.

Groundnuts (*Arachis hypogea*)

1. The main groundnut producing areas are in the Sudan Savanna zone where rainfall does not exceed 40 inches per annum. In all other zones of the region "rosette" disease of groundnuts may be a limiting factor when climatic conditions are unfavourable.

2. On the Sudan Savanna it has been found that long season varieties consistently outyield early maturing types. The optimum planting date is May to mid-June. Work is in progress to find varieties which will outyield the local type of the far north.

3. Seed deterioration studies have shown that in some instances poor storage conditions cause a physiological deterioration of the seed while in others, certain varieties are prone to fungal attack after harvest.

4. Variety trials and planting sequences have continued in the Provinces. Selection work and the classification of all groundnut varieties continued at Samaru and Kano.

Soya Beans (*Glycine max*)

1. Soya bean variety trials and planting sequences were again grown at stations in the Riverain area. Results confirm that the Malayan variety now being distributed is the highest yielding variety available at present. Planting sequences are being repeated.

2. Selections work continues and promising new introductions are undergoing tests at Mokwa.

Sesame—(Benniseed) (*Sesamum indicum*)

1. The hybridization programme begun in 1956 has produced some very promising material. High yielding, white-seeded, multilocular strains, adapted to Nigerian conditions are being selected and are under test at Mokwa.

2. The selection programme on local benniseed has continued at Yandev.

Cassava (*Manihot spp.*)

1. Four regional trials were laid down in 1957 (1958 results are not available until the following year).

2. In two trials in Kabba province an introduced variety, GCH 7 significantly out-yielded the local variety. However in Benue province introduced varieties were found to be no better than the local variety.

3. At Samaru results of trials show that variety CH 50 can be recommended for distribution. In 1958 test plots of this variety were laid down in, and adjacent to, Zaria province.

4. In a mosaic yield trial varieties Gamagari and Doneji had their yields seriously reduced by mosaic virus attack but the yield of variety Danwari was unaffected.

Sugar Cane (*Saccharum officinarum*)

1. As a result of a series of variety trials conducted at Maigana it is evident that all our introduced varieties are higher yielding than the local variety. Varieties CO 301 and POJ 2725 can be recommended for distribution as the best sugar producing varieties so far tested.

2. Investigations on hot water treatment of planting sets were made at Samaru. Varieties were multiplied for and supplied to the Bacita Sugarcane Scheme.

Horticultural Crops

1. Work continued on the establishment of new compounds and the planting of roadside hedges and trees.

2. A six months course for nursery demonstrators was held at Samaru. The trainees were all from outstations.

3. The kola establishment trial has survived another dry season and indications are that pigeon pea is totally unsuited as a form of temporary shade due to root competition for soil moisture and nutrients.

4. Experiments have been continued to determine the optimum time for budding citrus and mango. Budding of citrus during the dry season has given good results.

5. The Magic-Leaf mist propagating equipment has been installed and is being tested in anticipation of a planned experimental programme in 1959.

TREE CROPS—KABBA PROVINCE

In conjuction with development of tree crops in the Riverain provinces of the Northern Region, investigations were commenced on the site of the proposed Riverain School of Agriculture, Kabba, in June, 1958.

Nursery Investigations

1. Investigations in the nursery techniques for cocoa, coffee, kola and oil palm have been started.

2. Investigations have recently been commenced into the vegetative propagation of kola by cuttings, layer beds and grafting.

3. The main developmental problem on the site of the Riverain School of Agriculture before tree crops can be established, is the control of spear grass (*Imperata cylindrica*) and subsequent establishment of shade. Trials using dalapon combined with various cover crops are being carried out at the present time. Trial plantings of a range of species suitable for shade have also been made.

4. Six trial plantings of cocoa, coffee, kola and oil palm, already established on benchland areas of the site, have been maintained and are beginning to yield information which should be applicable to the establishment of new plantings of tree crops.

PLANT PATHOLOGY

1. Work has continued on an investigation into a condition, provisionally called "distortion", which occurs on guineacorn, maize and other *Gramineae*. It is most prevalent on farmers' fields, appears to be wide-spread and can cause considerable loss of stand. It was found to be caused by small numbers of mealy bugs, *Heterococcus sp.*, feeding on the plants.

2. Blight of tangello and other citrus seedlings caused by *Phytophthora parasitica* was troublesome at Samaru but cleaning up of the orchard and removal of fallen fruit controlled the blight.

3. Seed dressing work continued and it was found that the best fungicide used in the trials on groundnuts, guineacorn and millet was Fernasan 75W (containing 75 per cent thiram). In the first two crops it gave significant increased germination over the nil treatment. This result confirmed previous work on the effectiveness of thiram.

4. Work continued on legume nodulation. On groundnuts natural nodulation occurred on all sites examined and commercial inoculum had no beneficial effect either on yield or on total number of nodules or their effectivity. It was found that the ratio of weight of nodules to the weight of entire root systems was constant for each variety.

COTTON BREEDING

1. Plant breeding work on cotton was continued on established lines. Reselected substrains of Samaru 26J continued to show promise of further advance in yield and selections for satisfactory lint length were obtained from within even the highest yielding material.

2. Some of the lines emerging from past seasons' hybridization work were chosen as being of sufficient promise to carry forward to replicated trials next season. Some strains from East Africa and from Tchad Territory were grown and seed saved for further trial.

3. A special study of comparative selection techniques was commenced and the yields and laboratory characters of 1,000 separate single plants were recorded in detail for analysis in various groupings. This work should yield in the course of the next few years both valuable information on breeding methods and a number of high yielding strains possessing distinctive characteristics such as high ginning percentage, large boll size and lint fulfilling specified quality requirements.

4. The district variety tests gave rather variable and generally disappointing results this season but the combined data on yield, ginning percentage and lint length confirmed that the present wave of Samaru 26J seed under multiplication is well up to standard and that some of the other strains are worthy of further trial.

5. The large scale seed multiplication of Samaru 26J proceeded successfully and stocks were built up sufficient to provide over 60 per cent of the planting seed requirements of the 1959-60 commercial crop. Season 1960-61 should therefore see the complete replacement of 26C by the new strain.

6. Experiments comparing various methods of cultivating the land for cotton crops were continued and yielded further valuable information in the relationships between rainfall, soil treatment, fertilizer application and crop growth and yield. The half acre plot which is annually given all possible treatments likely to improve yield gave this season a crop equivalent to 2246 lb—just over one ton—of seed cotton per acre. This is about ten times the general average yield level of the Northern Nigerian cotton crop and was obtained in a season of much below average rainfall.

7. Experiments on seed dressing to control bacterial blight had to be suspended pending the recruitment of a new plant pathologist but plans were proceeded with for large scale seed dressing employing a new design of machine.

ENTOMOLOGY SECTION

1. The season was remarkable for the high yields given by cotton treated with insecticides; at four separate stations yields of over 1,000 lb seed cotton per acre were obtained. It has become obvious that, under suitable conditions (which can only be achieved experimentally at present), the maximum yields possible in Northern Nigeria are equal to those from American type cotton in other countries.

2. The cotton stainer caused considerable damage to bolls set during September and October on early-sown and well-grown cotton, unless controlled by insecticides. The incidence of this insect on cotton and several alternative hosts was followed throughout the year at Mokwa.

3. Bollworms became common during October and November, and further information has been obtained on bollworm parasites.

4. At Samaru insecticides are being used on cotton to enable the true effects of various cultural treatments to be determined. At Daudawa insecticides were successfully applied to 189 acres of multiplication cotton. In the Riverain areas, except at Lowlands an abnormally long dry spell of up to seven weeks was a major factor in reducing the yields from insecticide trials. The occurrence of a red spider mite following the use of insecticide was noted.

5. Observations on the aphid vector of rosette disease of groundnuts have continued at Samaru and Mokwa. At Samaru the original scattered attack in mid-June appeared to be due to the influx of infected winged forms. These formed small colonies from which apterous forms migrated within the crops towards the end of July. No alternative dry-season hosts of the aphid have been found.

6. At Mokwa the main spread within the crop occurred during June and July, but the cause of the original infection is still obscure. At this station volunteer groundnuts survive through the dry season and support large colonies of aphids; no winged forms were seen until mid-July, although rosette appeared in the main crop in May.

7. Further observations have been made on the biology of citrus pests at Mokwa and Samaru, and effective chemical control measures have been devised for some of the more important insects. At Gaya (Kano province) investigations on the harvester ant showed that good control could be achieved by using various aldrin treatments. Malathion was used at Mokwa to prevent attack by gall midges during the flowering period of benniseed.

8. Investigations have continued on the problems of pest damage in stored cereals. Lindane, applied as an 0.5 per cent dust to the surface layers of grain in native stores, was effective in reducing damage. As this method is likely to be impracticable for the farmer, new trials have been initiated in which the whole of the grain in the store is treated. Several of the more important storage pests were found to occur on guineacorn and maize in the field before harvest. There are indications that the infestation of threshed guineacorn is less than that of unthreshed.

9. Grain samples taken from the Argentine tank at Samaru, which contains 130 tons of guineacorn, sealed in 1954, show that no marked deterioration of the contents had taken place.

Colonial Termite Research Unit

An entomologist of the Colonial Termite Research Unit is stationed at Samaru and is responsible for termite studies in all the West African Territories. A full report of his work is submitted to the Colonial Termite Research Unit.

Soil Poisoning

1. An experiment to test persistence of insecticides in soils exposed to weathering has been in progress since March 1957. The soils were tested after 20-23 months exposure by bioassay with *Trinervitermes sp.*

2. In the top 3 inches of soil, aldrin, dieldrin, and BHC. remain effective at original dosages of 2 lb per acre actual insecticide and above. In the 3-6 inches layer, aldrin and dieldrin remain effective at $\frac{1}{2}$ lb per acre actual insecticide and above.

Sensitivity of *Trinervitermes sp.* to Dieldrin

In an experiment to test variations in susceptibility between colonies of *Trinervitermes* sp. it was found that this species was sensitive to 0.0018 p.p.m. in filter paper, and that at this dosage there was some variation in the median lethal time between samples from different colonies.

Advisory work on termite problems in forestry and agriculture has continued.

AGRONOMY SECTION

During the past year, approximately 800 trials were analysed and summarised by the Agronomy Section. The section was directly responsible for 186 of the trials, the majority of these being fertilizer experiments.

Long Term Fertility Experiments

1. Many of the long term trials in the Region were started within the last ten years and work has begun reviewing the results of these experiments. A review of the standard D.N.P.K. experiments has been completed.

2. A review is being prepared of the monocropping versus rotation trial at Samaru in which each of the crops of the basic rotation, cotton, guineacorn and groundnuts, are grown at four levels of fertility, 0, 1, 3 and 5 tons farmyard manure per acre per annum, in rotation and monocroped. The indications from a study of the first ten years results are broadly:—

(*a*) Rotation is preferable to monocropping for both guineacorn and groundnuts. There is no reduction in yield resulting from continuous cultivation of cotton.

(*b*) In a rotation, no manure and 1 ton per acre per annum are not adequate to maintain yields. Three tons farmyard manure per acre

per annum appears to maintain yields of all crops. Five tons per acre per annum has tendered gradually to raise yields.

(*c*) With continual cultivation of a single crop the trend has been a fall in yields with no manure and 1 and 3 tons farmyard manure per acre per annum. Five tons farmyard manure per acre per annum has maintained yields.

(3) Trials to examine the effects of the length of a fallow on the subsequent crops in an arable-fallow rotation have been conducted at a number of centres in the Northern Region. A review of the results of these trials is not yet complete but the trends observed from a study of the trial at Samaru and those elsewhere are:—

(*a*) A six-year gamba (*Andropogon gayanus*) fallow gives better yields from an immediately following cotton crop than does a shorter fallow, (two and three years).

(*b*) In the second arable crop following the fallow the difference is no longer measurable. (The Samaru experiment with guineacorn in the second year was an exception).

(*c*) There is no measurable difference in the third arable crop.

(*d*) The tendency is for yields to decline where there is only a two or three years fallow in the rotation.

(*e*) By the third arable crop there is a fall in yields on all treatments irrespective of the length of the previous fallow.

(*f*) In all the experiments, no fertilizers were applied to the arable crops.

Fertilizer Trials

The programme of fertilizer experiments has grown considerably in in recent years. Results obtained so far are being prepared in the form of response curves. At present it is only possible to bulk the data together in order to obtain an indication of what is happening for a particular crop. The general picture so far obtained for each of the main crops is briefly outlined below.

Groundnuts (*Arachis hypogea*)

The results of fifty experiments at various centres indicate that a response of 125 lb kernels per acre is obtained from a dressing of 60 lb/acre of superphosphate. With a yield with no fertilizer of 698 lb kernels per acre, this represents a yield increase of 18 per cent. An outlay of eighteen shillings is required to obtain a net profit of twenty shillings. Much of this data comes from areas south of the main export producing areas. Further trials are planned for the main producing areas.

Sorghum (*Sorghum vulgare*)

(1) Fair responses are obtained from applications of superphosphate and sulphate of ammonia. Sixty lb per acre of superphosphate produces a response of 150 lb grain per acre or an increase of 19 per cent of the yield of

786 lb grain per acre without fertilizer. An outlay of eighteen shillings is required to obtain a net profit of twenty shillings.

(2) With sulphate of ammonia yield increases of up to 160 lb/acre grain are obtained but at no level is the application economic.

Yams (*Dioscorea sp.*)

The results of forty experiments in Ilorin Division show that an application of 240 lb of sulphate of ammonia per acre will give an increase in yield of 23.5 cwt per acre yam tubers, the average yield without fertilizer being 54.0 cwt per acre.

The responses show that the economic optimum dressing lies outside the range of fertilizer dressings tested (0-240 lb per acre) and for the time being recommendations will have to be confined to applications below 240 lb per acre. It appears that the optimum levels may in fact be nearly 320 lb per acre which at present ruling market prices would give a net profit of £17 per acre. It is believed that the keeping quality of the yams may be adversely effected by high dressings of nitrogen. The question is being investigated at present but if the findings are unfavourable the recommendations will have to be further modified.

2. Responses to superphosphate have not generally been obtained.

Swamp Rice (*Oryza sativa*)

The results are available from twenty-one experiments with N and P applied to rice. The major response has been to nitrogen: 240 lb per acre of sulphate of ammonia produce a yield increase of 470 lb paddy per acre. The average yields without fertilizer in these trials was 1,365 lb paddy per acre and the response to fertilizer represents a 34 per cent increase.

CHEMISTRY SECTION

Soil Nitrate and Ammonia

Weekly determinations of soil nitrate and ammonia under bare and bush fallow soils were continued to complete a period of two years. In addition to the findings which were reported in 1957-58 the following results were obtained:—

(*a*) The accumulation of nitrate in the bare plot in 1958-59 dry season was appreciably lower than that in the previous year. This was accompanied by a significant decrease in the level of organic carbon in the soil.

(*b*) The ammonia levels increase markedly in the bush fallow during the dry season and decreased after a 3-4 inches rainfall.

(*c*) In the bare plot nitrate was higher in the top soil (0-4 inches) than in the subsoil, whilst ammonia increased in the latter.

Blind Nuts in Groundnuts and Calcium Deficiency

Determinations of the calcium levels in soils from Kano province where the "blind-nut" problem had been over-come by the application of calcium as slaked lime revealed a correlation between shelling percentage and soil calcium. In areas where blind nuts were common Calcuim levels of 0.04-0.08 milliequivalents per cent were found whilst areas producing "full nuts" contained 0.15-0.24 milliequivalents per cent Calcuim in the soil.

Energy Requirements of Zebu Cows for Milk Production

Calculations of the starch equivalent intake and correlations with live weight and milk production indicate that the maintenance requirements are lower than those recommended in the literature. This was attributed to a greater efficiency with which the animals can utilize the fibre fraction of roughage. Requirements were statisfied when the correction factor for fibre was reduced from 0.38 to 0.18.

Ensilage Experiments

Pre-wilting of *Panicum maximum* resulted in a significant improvement in the digestibility of the silage. Digestible organic matter values for the wilted and unwilted material were 57.1 and 46.2.

Energy Cost of Grazing

A study of the nutrient intake and live weight gain of two groups of bulls (one group stall-fed and the other grazed) fed high and low protein concentrates of similar energy content produced the following results:

(*a*) Stall-fed animals (A) lost weight during the latter part of the rainy season when fed no supplements. Animals grazing (B) on the area from which grass was cut and fed indoors to A gained weight during the same period. The digestible organic matter and nitrogen intake of the grazing animals was appreciably higher. These results may be attributed to the ability of the grazing animal to select the more nutritious pasture.

(*b*) When the pasture-growth had ceased and both groups were fed concentrates groups A gained weight and group B lost weight. After three months all group B animals succumbed to trypanosomiasis which vitiated calculation of energy-cost-of-grazing.

(*c*) Group A animals on high protein retained more energy than those on low protein.

Nutritive Value of Fodders

Digestibility trials with sheep and cattle on different fodders, before and after conservation, have been conducted.

ANIMAL AND GRASSLAND SECTION: SHIKA AND KATSINA

1. Trials investigating sown pastures and rangeland management in the Guinea Savanna and the Sudan zone have continued.

2. In the Northern Guinea Savanna, which can be described as an *Isoberlinia —Hyparrhenia* association there is intense competition between the grass and scrub. The introduction of the grazing animal encourages the scrub at the expense of the grass and carrying capacity falls. Eradication of the scrub, by hand, mechanically or by the use of arboricides is costly and is probably not desirable. Some measure of scrub control in heavily grazed areas is essential and it is believed that it may be provided by a carefully timed fire. If burning is to be of benefit in a system of rangland management, it must be undertaken at the beginning of the rains, a recommendation which necessitates the prevention of fire during the dry season. Fire should not be used oftener than every second or third year but the accumulation of excessive amounts of dead material should be avoided. After burning it is necessary to exlude the animal for several months until the grass is growing vigorously.

3. The present practice of early dry season burning, which is often followed by grazing the new green growth, is extremely harmful to the plant and enccurages scrub dominance.

4. The most serious problem in animal production is the low feeding value of the upland herbage as it matures and throughout the dry season. Unless grass can be conserved as hay or silage during the rains, cattle must depend on river grazing, on browse plants and on the farm crop residues during the dry season. Other ways of providing dry season fodder, including sod seeding and supplementary grazing are being investigated.

5. In the Northern Sudan zone there is the greatest concentration of the country's cattle on account of its relative freedom from disease. The problems of grassland management are more difficult than in the Guinea Savanna. Naturally occurring grasses are predominantly short-lived annuals, which become bleached and fibrous and of negligible feeding value during the dry season. Satisfactory hay can be made from a few of these grasses. After use has been made of alternative fodder, many herds have to undertake long treks in search of suitable grazing during the dry season.

6. Trials with perennial grasses which would extend the grazing period have shown that relatively few grasses are able to survive the long dry season; *Andropogon gayanus*, *Setaria sphacelata*, *Pennisetum polystachyon* and *Cenchrus ciliaris* are among the few which are able to survive the unfavourable period. Among the perennial legumes *Stylosanthes gracilis* is the most promising although its survival is not always certain, and it suffers from dry season termite attack to an extent not encountered further south.

7. A number of distinct factors have contributed to the present serious situation due to trypanosomiasis. There is evidence that there has been a considerable spread of tsetse, especially *Glossina morsitans*, in Northern Nigeria during the last twenty years. As a result of this movement, the number of cases of trypanosomiasis have increased; this increase has been largely due to *Trypanosoma congolense*, whereas in the past *T. vivax* was more often diagnosed, in the fewer cases which occurred. At Shika, as a result of the

gradual increase in trypanosomiasis, it was decided in 1954 to clear the 3,000 acre farm of scrub and to use Antrycide Prosalt as a prophylactic every sixty days. Since the removal of the scrub very few tsetse have been caught on the farm. In less than two years of Antrycide treatment the organism became resistant to Antrycide and to related drugs. In spite of the absence of tsetse the disease has continued to spread through the herd, presumably through mechanical transmission, and the treatment of cases with drugs has been ineffective, with the result that in February 1959 it was decided to suspend all chemotherapy in an attempt to reduce drug-resistance. In the absence of any form of treatment losses of stock have been very heavy.

SOIL SURVEY SECTION

1. The section's main aim during the period under review was the continuation of systematic reconnaissance surveys of the Region's 281,782 square miles, at the same time carrying out more detailed surveys of development projects wherever necessary. In addition, training of junior service staff continued during the non-field season.

2. Three field teams operated during the season resulting in the completion of some 5,000 square miles of reconnaissance surveys.

3. In the Zamfara Valley extension of the previously reported survey onto the Anka sheet was carried out, resulting in the completion to date of 2,400 square miles of country extending in a broad belt some 25 miles wide and 70 miles long astride and slightly to the north of the Zamfara River. All major soil associations within this area have now been investigated.

4. Work continued in the Gombe–Potiskum area where the new railway extension will encourage agricultural development. Work carried out during the season increased the area surveyed from 1,200 square miles to 5,000 square miles, three survey sheets being completed during the year. The excellent correlation between the major soil associations and the underlying geology previously cited in the Gombe area was found to continue some 90 miles northwards until obscured by local sand drift near Potiskum.

5. Included in the project work carried out during the year were soil survey investigations of areas for possible resettlement near Ashigashiya and of agricultural development possibilities on the Mambilla Plateau, with particular reference to coffee production.

6. The work of the cartographic section continued apace with field work. More than twenty maps have been produced and distributed ranging in scale from 1 : 2,400 to 1 : 3,000,000, the latter being a revised soil map of the Northern Region.

LIBRARY

1. The library has continued to expand and again more use has been made of it as shown by a rise in loans to 2,000 during the current year.

2. Over 1,000 books and pamphlets and 74 microfilms were added to the library and 33 new periodicals were taken, bringing the current list

to 220. An attempt has been made to fill outstanding gaps in our files of periodicals through purchase of back-numbers and through the British National Book Centre exchange system: the latter has been very successful.

3. In May, 1958 a monthly News Letter was started for circulation to station staff and the staff of Field Services Division. The following October this News Letter was expanded into a Ministry News Letter to which each division of the Ministry was asked to contribute technical articles. The editing of the Ministry News Letter, its production and distribution are the responsibility of the library.

4. In addition to 198 volumes of periodicals bound, a number of other jobs were done such as the binding of Soil Survey Bulletins, pamphlets and the repair of books.

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